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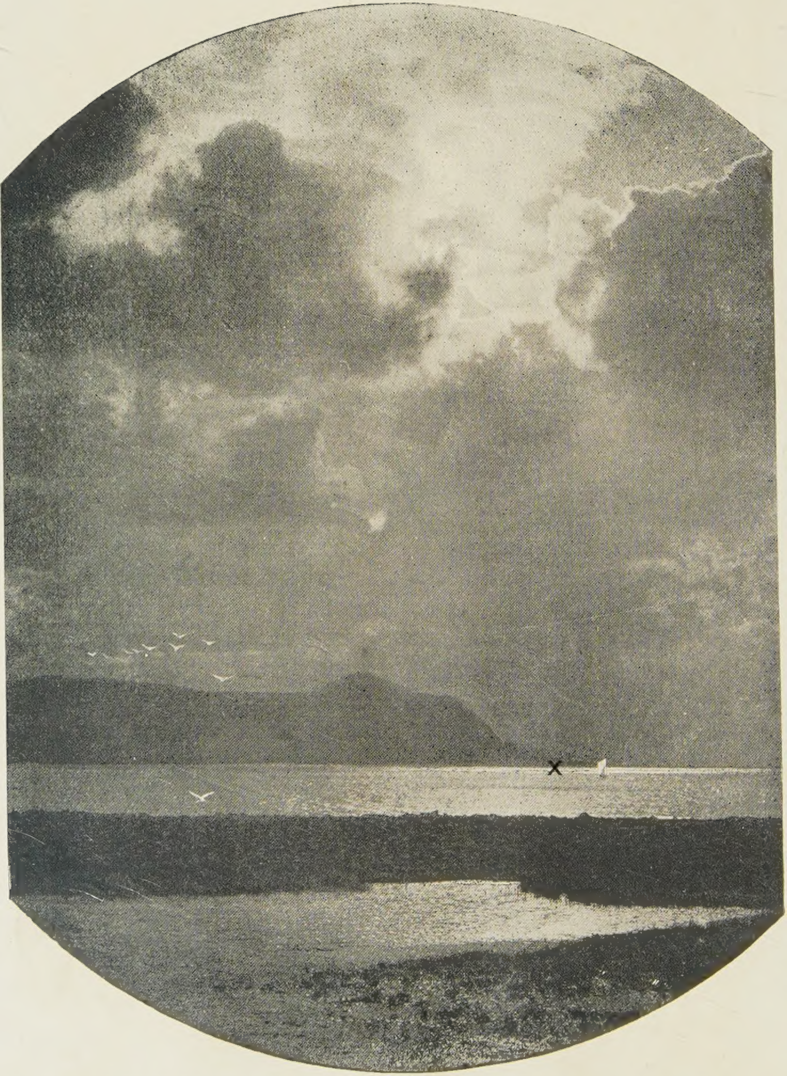

Site of Llys Helig (indicated by X) "The Palace under the Sea" (see page 182), from Llandudno West Shore ; Penmaenmawr Mountain in distance.

THE BATTLE
OF
LAND AND SEA
ON THE
LANCASHIRE, CHESHIRE
AND
NORTH WALES COASTS,

WITH SPECIAL REFERENCE TO THE ORIGIN OF THE
LANCASHIRE SANDHILLS.

BY
WILLIAM ASHTON.

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FIRST IMPRESSION, MAY, 1909.
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(Revised and with Additions).

ERRATUM.

On page 34, second paragraph, mention has inadvertently been omitted of Fleetwood as another deep-water harbour between the Mersey and Clyde. The depth at the bar at low water has been increased in the last few years from 9 to 16 feet, and will shortly be further increased to 18 feet.

C 23

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INTRODUCTION.

To one who early in life fell into the habit of pondering the causes of things, and whose life has been mainly spent in close touch with the Lancashire sandhills, it was a natural thing that his attention should be attracted by the fact that the origin and history of these sandhills had never yet received an entirely adequate explanation, at all events in popularly presented form. Rivers, prevailing winds, and tidal currents are to be found at frequent intervals round the entire coast, but on no section of coast round the British Isles is to be found an area of 22 square miles under sand along a similar length of shore-line.

Examination of what was already known made clear the fact that much remained obscure. Why, for example, are the Lancashire sandhill ranges in course of rapid accumulation whilst the closely-adjoining hill ranges on the Cheshire and Flintshire coasts are as rapidly wearing away? Of this problem no satisfactory solution was discoverable. A series of observations and note-takings extending over several years was accordingly entered upon, and this little work is the result. It is put forward, however, rather as a contribution to, than as a complete solution of, the many points of difficulty in a somewhat complex problem. Speculation necessarily enters in somewhat largely, but care has been taken to draw distinctions between demonstrated facts and theories deduced therefrom. Some tentative propositions put forward may have to be qualified, or possibly altogether withdrawn, in the light of fresh considerations.

The thoroughly-equipped geologist will also soon discover that the book, by its general avoidance of geological terms, is not intended for him so much as for the general reader, who may be interested in a brief outlining of the principal factors which have determined the present aspect of the Lancashire, Cheshire, and North Wales coasts.

As it is not possible to understand the causes which are making for sand accumulation on the Lancashire coast without some study of the adjoining coasts, the investigation has developed into one of larger scope than originally designed. Some gaps of omission as regards thoroughness of treatment here and there may be noticed.

These the writer hopes to fill in later, should a further edition be called for. In view of such further issue, he hopes that any errors which may have crept in will be pointed out by any readers who may note such.

The assistance of the following gentlemen has been warmly appreciated, and is entitled to the acknowledgment now made:—

Mr. Thomas Fair, Clifton Hall, Preston;

Mr. W. E. Gregson, Great Crosby;

Mr. T. Mellard Reade, F.G.S., A.M.I.C.E., Blundellsands;

Mr. Harold Brodrick, M.A., F.G.S., Birkdale (whose help in proof-correcting has been invaluable);

Mr. John Formby, J.P., Formby Hall;

Rev. W. T. Bulpit, Southport;

Mr. W. H. Stansfield, F.R.H.S., Southport;

Mr. Henry Ball, Southport;

Mr. James Pearson, Blackpool;

Rev. Meredith Hughes, Prestatyn;

Mr. J. H. Ellis, J.P., C.C., Rhyl; and

Mr. G. A. Humphreys, F.R.I.B.A., Llandudno, by whose kind permission the block of the "Geological Clock" has been used.

By the kind permission of Mr. W. F. IRVINE, F.S.A., Hon. Secretary of the Historic Society of Lancashire and Cheshire, I have also made use of some maps which appeared in illustration of a paper contributed to the 1894 Volume of the Transactions of the same Society by the late Mr. E. W. Cox, who collected much useful material bearing upon the subject of this book.

MR. F. HOLLAND, Llandudno;

MR. A. EDMONDSON, Morecambe;

MR. JAMES BOWMAN, St. Annes-on-the-Sea;

CAPTAIN ROBERT BICKERSTAFFE, Blackpool;

MR. A. T. GIBSON, Fleetwood;

CAPTAIN FISH, Deputy Harbour Master, Fleetwood.

The recent sad and tragical death of Mr. Joseph Lomas, for 25 years Lecturer on Geology in connection with the University of Liverpool, has made impossible personal acknowledgment of help always cheerfully and fully rendered, and which has been of the utmost value in the writing of these chapters. Only a few days before his end a letter in appreciation of the Mersey chapter, which had been submitted for his approval, and the central theory in which he entirely accepted, had been received from him. His loss cannot fail to be severely felt by the younger generation of geological students.

27, Irton Road,
Southport.
W. A.
April 5th, 1909.

NOTE TO SECOND EDITION.

In the few weeks which have elapsed since the first edition of this book passed through the press the science of Geology has sustained another heavy loss in the death of Mr. Mellard T. Reade, F.G.S., A.M.I.C.E. His devotion to the study of these coasts, and his voluminous writings, extending over a period of forty years, on the glacial and post-glacial deposits of Lancashire and Cheshire, and allied subjects, had given him a position of quite exceptional authority and respect. The author of these chapters is indebted to him for ready assistance whenever approached in the course of their compilation.

W. A.

July 1st, 1909.

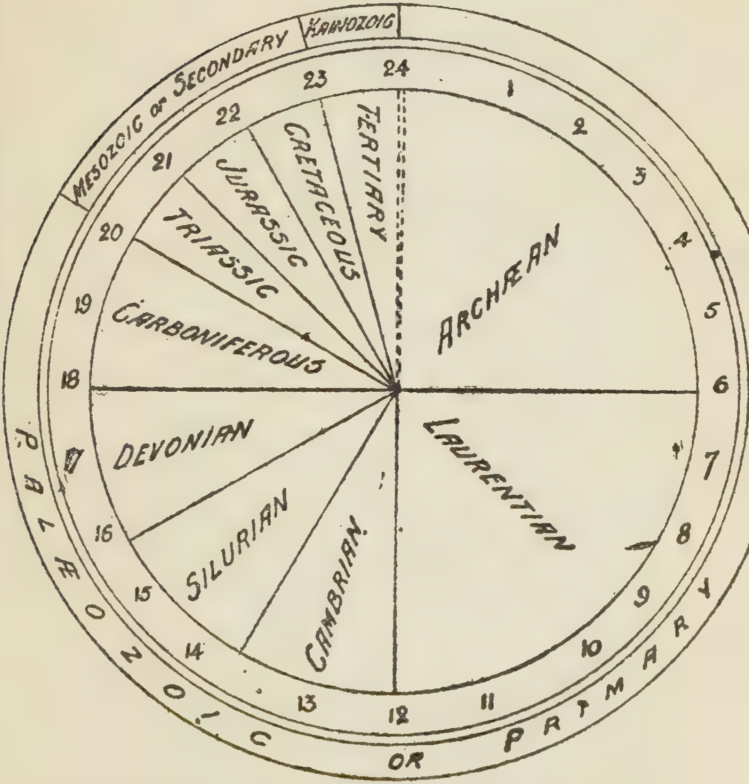
CHAPTER I.

A Glance Over the Far Past.

If the history of the geological changes of the earth's crust be divided into twenty-four hours on a clock face, six hours will cover the period during which the whole of the strata which appear upon or near the surface, on the Lancashire, Cheshire, and North Wales coasts, were laid down. The outstanding buttresses of Penmaenmawr and Penmaenbach mountains alone should be possibly excepted, as they are amongst the most ancient in origin of all rock formations, the former being volcanic in character.

The appended geological clock, which is based on Professor Lesfer Ward's calculations in "Pure Sociology," makes clear these principal epochs in the life of the earth. Assuming that the total period amounts to 72 millions of years—an estimate of doubtful value, though not without reasons to

GEOLOGICAL CLOCK
OF THE
WORLD'S HISTORY.



The dotted lines at the close of the Tertiary section represent the period covered by Human History, the Quaternary period.

(Reproduced by kind permission of Mr. G. A. Humphreys, F.R.I.B.A.)

support it—the carboniferous period will represent six millions of years. During this period the mountain limestone deposits, to which belong the Great and Little Orme's Heads and Penmaen Head, near Old Colwyn, were laid down.

To the same group belong the millstone grit formations of East and North-East Lancashire and much of the Pennine Range, also the hills about Parbold. Next in upward order, but of the same Carboniferous series, are the coal measures of Central and South Lancashire.

During the next, or Triassic period, after another general subsidence and interval, there were laid down the new red sandstone deposits which we find cropping out at Hilbre Island, Hoylake; the Red Noses, at New Brighton; in the railway cuttings at Ormskirk and Edgehill; at Halsall, and at Heysham. Triassic rocks are believed to lie not far from the surface at all other points throughout the South Lancashire and Cheshire Plain. At the Palace Hotel, Birkdale, a boring showed them to lie at a depth of 79 feet. The dividing line between the Carboniferous and Triassic series runs near to Samlesbury, Euxton, Leyland, Bispham, and in a line between Rainford and Knowsley. The Jurassic and Cretaceous formations are unrepresented on the coasts under review.

Coming to the Tertiary division, or the last hour of the clock, large volcanoes were active at this period in the West of Scotland and North of Ireland, the curious formations of Staffa and the Giant's Causeway being the direct result of such volcanic activity. The volcanoes of Skye and Mull must have been at least 10,000 feet in height. At this time the climate was sub-tropical, and Britain was a part of the Continent.

The minute segment of the clock circle enclosed between dotted lines, at the close of the Tertiary and which is known as the Quaternary period, stands for a few minutes only in the great day of the earth's history; yet within it man has appeared, the Irish Sea has become uplifted to form dry land, and has been again depressed—portions probably more than once; the whole of Lancashire west of a line drawn through Crosby, Ormskirk, and Garstang laid down, and other vast changes have taken place. In the early part of this period the mastodon, rhinoceros, hippopotamus, and antelope roamed in Britain.

The great feature of the early part of the Quaternary period was the submergence to a considerable depth of the land, and the setting in, through causes probably astronomical, of a period of Arctic cold. During this period Britain north of a line drawn from the mouth of the Severn to the Wash, became covered with an ice mantle of vast thickness, such as that which covers Greenland and Spitzbergen to-day. This ice-sheet carried with it its burden of boulders and eroded material, to deposit them at more or less distant parts. From this period, especially towards its close, dates the laying down of the boulder clay which covers such a large extent of the older formations in so many parts of the North of England, and the North of the Isle of Man. These clay deposits are well seen at Llandudno, Colwyn Bay, the Clwyd Valley, at Crossens, near Southport, Hesketh Bank, and between Blackpool and Fleetwood. The upper boulder clay is that which is worked for brickmaking at Croston, Hesketh Bank, Preston, and Blackpool. The rounded water and ice-worn stones with which this deposit abounds are those which form the cobble stone pavement of many country roads, and with which the old houses of Churchtown, and many villages in the Fylde, were formerly built.

The manner of the origin of this boulder clay has been much debated, but there is general agreement that it was the product of the ice of the Glacial period, probably by a dragging up of the sea bottom and a plastering of the same against the shores of the period. There is conclusive evidence that floating glaciers conveyed stones from Galloway, in Scotland, and from the Cumberland Hills, always in a southerly direction, in the fact that so many of these wandering, ice-scratched boulders are still to be found in many places in the Clwyd Valley, the Wirral peninsula, the West Lancashire plain, and the Fylde district. Good examples are to be seen at Great Crosby, where a large boulder of gypseous alabaster has been enclosed within railings in the main road; on the beach north of Blackpool; at Crossens, near Southport, where two large boulders, one of Eskdale granite, and the other of mountain limestone, each about three by two feet, may be seen in the churchyard; another Crossens boulder, 60 by 18 inches, is in a garden on the opposite side of the main road; another at Southport, by the roadside near the corner of Southbank Road and Ash Lane, consisting of volcanic ash from Borrowdale; and one on the roadside leading from Birkdale Common to Scarisbrick, estimated at about 200 cubic feet in size.

Boulder clay deposits are frequently found interlaid with peat or beds of sand, showing that warmer periods separated times of Arctic cold. When the Irish Sea was a mass of frozen glaciers, the ice welled over the Lancashire coastal plains as far as the Pennine Chain. The drainage of Lancashire and Cheshire at this time, and for a long period subsequently, was forced, through the blocking of the Irish Sea, into new channels, leading into the Trent and Severn valleys and over the lower passes of the Pennine plain into Yorkshire. Evidence of this is seen in deep gorges filled with glacial drift, such as have been examined in recent years at Ironbridge, in Shropshire, and at Rudyard, in Staffordshire. The stones found in these old river beds are largely of Northern origin. In Lancashire, valleys such as that of the Douglas between Wigan and Parbold, and gorges now almost dry at Anglezark and Rivington, were probably formed by the ice-diverted drainage of this time.

We do not know whether the drainage of the River Ribble was diverted during this period, but, if so, it has since resumed the course which it took in pre-glacial days. This must have been at least 100,000 years ago. Conclusive proof of this (not of the date, which is highly speculative) was found in the course of the Preston dock excavations when a water-worn channel in the sandstone underlying the boulder clay was found in practically the same course which the river takes to-day.

The Parbold gorge was probably excavated by waters imprisoned in a lake at some stage of the glacial period between the hills and the ice, the waters flowing east and then south from Wigan. The Parbold range of hills represents a coast-line of a much older period than when glacial conditions prevailed. At a much later time, but before the advance of the ice, this coast-line would probably follow a line connecting Crosby, Ormskirk, Preston, and Garstang, or eight or ten miles inland of the present coast. Wallasey, West Kirby, Hilbre, and Halsall would then stand out as islands in the sea of that period. The Vale of Clwyd was an arm of the sea, its floor having been since filled with glacial drift.

Borings taken for Mr. T. Mellard Reade in 1872 showed that the glacial deposits gradually increase in thickness from Seaforth to Southport. Thus there were found to be :

Opposite Blundellsands, only 6-ft. of sand.

At Hightown (Martin Farm), 33-ft. of sand.

Another boring taken at the Palace Hotel, Birkdale, in 1870, showed the red marl (upper keuper) to lie 79-ft. 6-in. beneath the sand-surface. From this point to Crossens, the boulder clay comes nearer the surface, and is cut through by the Sluice near Crossens Mill. At Crowlands, Southport, a depth of over 40-ft. of post-glacial deposits was found.

On the final disappearance of the ice, glacier-borne deposits and boulder clay filled much of what had previously formed the bed of the Irish Sea. It is impossible to determine how much further than the present coast the land then extended, but from the shallow depth of the sea between Lancashire and the Isle of Man—nowhere more than about 20 fathoms—it is highly probable that the Isle of Man was then a part of the mainland. The rate of the land erosion on the Cheshire coast will be considered in the chapter dealing with that section. It shows that there has been ample time since the close of the Glacial period—estimated by some geologists as coming to a close at about 80,000 years ago (the data is doubtful), even at the moderate rate of 400 yards a century, for sea erosion to have worn back the coast the entire space of the intervening sea.

There is evidence of another kind. "The discovery of the great Irish elk in the peat near St. John's (I.O.M.) and in the forest on the shore-line near Standhall" (says Prof. W. Boyd Dawkins, Brit. Ass., 1896 Report, p. 779), "proves that the Isle of Man was united to Ireland or Britain in the prehistoric age." A theory has latterly been put forward suggesting that the elk migrated to the Isle of Man and Ireland, over the connecting ice-sheet, during the glacial period. Remains of the elk have also been found underlying the peat beds at Crowlands, Southport. Between the Isle of Man and Ireland the sea is of much greater depth than on the east side, and it is improbable that there has been any junction here for a considerable period of time.

The late Dr. Bailey, of Manchester and Port Erin, had made a special study of beetles, and the evidence he had accumulated led to the conclusion that "the Manx Coleopterous fauna is derived mainly from migrations across former land connections, both from England and Ireland," subsequent to the Glacial age.

But coastal lines are subject to modification from quite another cause than erosion or accretion. Subsidences of the earth's surface from causes more or less deep-seated within the earth, alternating with elevations, steadily continued over long periods of time or intermittent in character, are often important determinants, and they have entered in as complicating factors in the history of the coast-line under consideration. To satisfactorily account for the dammed-up drainage which has led to the formation of peat beds, and also for the existence of the submarine and estuarine forest beds, which will be referred to in a later chapter, we are compelled to adopt the theory of one or possibly two elevations and subsidences along the greater portion of these coasts since the period when land was continuous between Lancashire and the Isle of Man.

Often these changes of level have been merely local, and they are still proceeding. The extent of and exact order in which the various elevations and subsidences affecting the shores of the Irish Sea—one or more—since the close of the Glacial epoch, have taken place, is a subject requiring an extensive and detailed knowledge of the whole facts. No one is more competent to be heard with respect on this complex question than Mr. T. Mellard Reade, F.G.S., A.M.I.C.E. In his evidence before the Coast Erosion Commission (Vol. I., p. 209, 1907) he stated with reference to the South Lancashire coast :—

" The belt of alluvial deposits reaches a maximum of four miles wide at Altcar and Formby. " The belt rests upon what was formerly a land " surface carved out of the boulder clay and the " underlying rocks when the land relatively to the " sea was at a considerably higher level than it is " at present. After the lapse of an unknown " length of time a slow subsidence of the land " set in and did not cease till the shore-line " became approximately conterminous with the " present 25-feet contour. During this subsidence " the sea encroached upon the land, filled up the " valleys with silt, and built out the coastal plain.

" After a period the land began to rise out of " the waters, and drainage being thus provided, " trees, ferns, and other vegetation flourished.

"It may be that there was a land connection with "the Isle of Man.

"The final downward movement now set in, "which, curiously enough, terminated at a level "nearly corresponding with that of the alluvial "deposits just described."

Serious differences of opinion exist, however, as to the immediate causes of the inland meres and the Lancashire sandhill accumulations. In the following chapters a modification of Mr. Reade's general theory has been adopted, as, in the writer's opinion, more satisfactorily accounting for the facts as we have them.

The Shirdley Hill sand—a white, reddish, or dark-coloured sand of larger grain, and devoid of the black grains which distinguish the sand of the coast—was so named from being so plentifully found at the place of that name, four miles inland from Southport. A nine-feet section may be well seen in a sand pit near Holmes Wood Hall. It is invariably found overlying the boulder clay, and occasionally on a thin growth of peat. It is probably the remains of an ancient line of coast hills which were blown far and wide subsequent to the Glacial period, and before vegetation had become spread to bind the surface.

Underlying the peat mosses is found a layer of bluish-grey clay or silt. This nowhere comes to the surface. At its thickest it is about 20 feet, and it thins out to a line from the mouth of the Alt to the mouth of the Douglas, about three miles from the coast. It is known by the name of the Formby and Leasowe marine beds.

CHAPTER II.

THE PEAT AND FOREST PERIOD.

When Britain was last a part of the Continent after the glacial conditions had finally passed away, the climate became favourable to the growth of great forests, which ultimately covered the greater part of Britain as well as the undulating plain of the German Ocean, and probably much of what is now the Irish Sea. The remains form the now submerged forest bed or beds to which reference will be made in the chapter dealing with the Cheshire coast, and elsewhere.

A general subsidence followed. Britain was finally isolated from the Continent; the climate became more humid, the forests in great part decayed, and their remains became enveloped in, or covered with, peat mosses. These peat mosses consist of extensive accumulations of vegetable matter, largely of bog-moss, heather, sphagnum, sedges, and occasionally of aquatic plants. Around Martin Mere sphagnum is the chief constituent. They are usually formed under conditions of obstructed drainage. They are particularly well represented in parts of Cheshire and in South-West Lancashire. They extend from the River Alt to the River Douglas, having a width of at least two miles, and almost everywhere underlie the blown sand of the coast. They attain in places a thickness of 20 feet, as at Wyke Farm and Mere Farm, between Rufford and Southport.

The surface of the drift left at the close of the Glacial period was presumably of a hummocky character, interspersed with deep hollows. In these hollows, at first filled with water, vegetation formed, which in time decayed and became peat.

The remains of these ancient meres are seen in Tarleton Moss, Martin Mere, Marton Mere, between Kirkham and Blackpool (which in the 16th century covered quite a large area); Barton Moss, Ince Marshes, and Simonswood Moss. The old Curridmere, north-west of Lytham, is now drained, the site being known as "The Tarns." Sefton Meadows, near Bootle, probably cover the site of an ancient mere.

The peat beds were not necessarily connected to form one large bog, but were separated into small areas by banks of boulder clay, on which trees grew and formed fringes round the growing peat. The peat in the middle of the bogs swelled in growing and eventually killed the trees. Such a bank or forest edge has been traced from

Scarisbrick, past Shirdley Hill Station, Plex Moss, between Altcar and Formby, past Hightown, the mouth of the Alt river, across the Mersey to Leasowe and West Kirby.

Submerged forests with peat-mosses fringe most of the estuaries of the Lancashire, Cheshire, North Wales, and Cumberland coasts. Remains of tree stumps may still be seen at extreme low tide on the coast east of Rhyl; on the north-west coast of Anglesey; on the Cheshire coast, near Leasowe; and on the Lancashire coast, at the mouth of the Alt river; at Lytham Pool, to the east of Lytham; and near Rossall. Tree stumps could be seen within the last hundred years (Baines' "History of Lancashire") at Hesketh Bank. The remains are mostly of oak, birch, and Scotch fir, and are often of quite gigantic size. Yews and pollard ash also are found. The black bog oak so often used for ornamental purposes in gardens at Southport and elsewhere is a relic of this ancient forest.

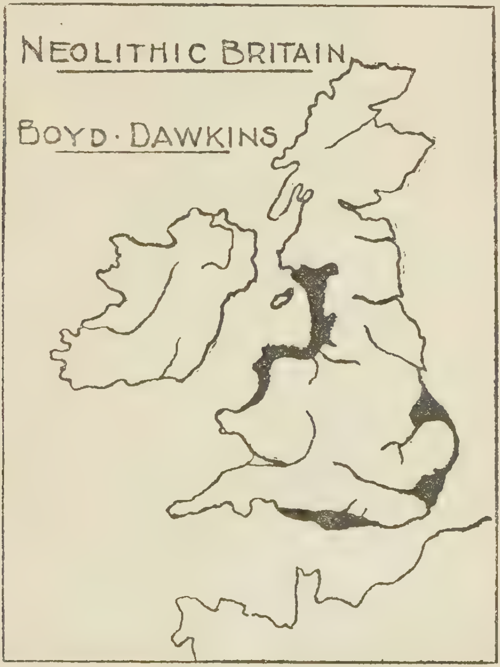
The fixing of any date in connection with this forest period is not possible, but as late as the time of the Roman occupation, tradition has it, that a squirrel could pass from tree to tree from Formby to Hilbre. The chapter on the past of the Mersey River will render this quite credible. That what is now Liverpool Bay was in Roman times largely a land of moss, mere, and forest cannot be doubted in the face of the evidence which will be advanced. A 16th century map shows a large island, believed to be the now submerged Burbo Bank, upon which, according to authenticated tradition, a fresh-water well, surrounded with masonry, once stood. Dredging has proved the existence of peat near the Mersey bar, some miles away from the present mouth.

Peat-mosses may belong to the Neolithic, Bronze, or Iron ages. The Neolithic age, when polished flint implements began to be used, marks the beginning of what is termed the Prehistoric period. It was in Neolithic times, perhaps four thousand years ago, that the last great subsidence affecting England generally is believed to have set in. Prior to this sinking the sea probably stood about 60 feet below its present level. Almost every estuary round the coast furnishes evidence of this difference of level, especially the Thames, Wash, Humber, and Cornish river estuaries.

This downward movement ended (according to Mr. T. M. Reade) some 3500 years ago—about the time when Stonehenge is believed to have been built. Since this date there is no evidence of any general change, but in the Mersey basin and on the North Wales coast there has been undoubted subsidence in progress, and the mean tide level at Liverpool continues to show a slow but steady rise.

This authoritative opinion as regards the stationary level of the coast-line north of the Mersey—the elevating influence of blowing sand is ignored—may be in strict accordance with the facts, but in the absence of standards in the shape of rocks, buildings, or harbours, proof of this contention is not possible.

The formation of most of our shingle beaches, and the commencement of the serious erosion on the east and south coasts which led to the Coast Erosion Commission investigation of 1906-8, is believed to date from this Neolithic period of about 3500 B.C. Between Flamborough Head, on the Yorkshire coast, and the Thames estuary, this waste is estimated to be still taking place at the average rate of a yard per year. But any



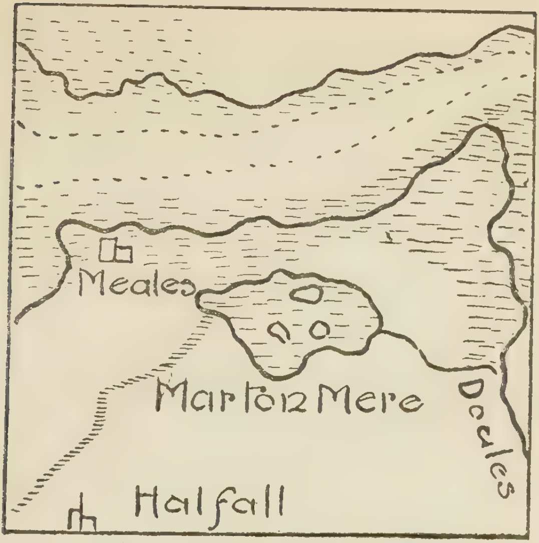
The black portions show the parts worn away since the Neolithic Period loss from erosion on the Lancashire coast has been more than compensated for by accretions on the sandhill sections. Evidence was put before the Commission showing that this gain amounted in the 35 years ending 1897, on the Lancashire coast, to 9090 acres, chiefly between Bootle and Southport. The eroded area, chiefly on the north-west side of Morecambe Bay, Walney, and Dalton, was estimated at 545 acres.

Since the great change just referred to set in, the estuaries and harbours almost all round the coast have been tending to silt up. Much has been written upon the silting of the channels in the Ribble estuary, but the same process is equally marked in many others—the Dee and Tees, for example.

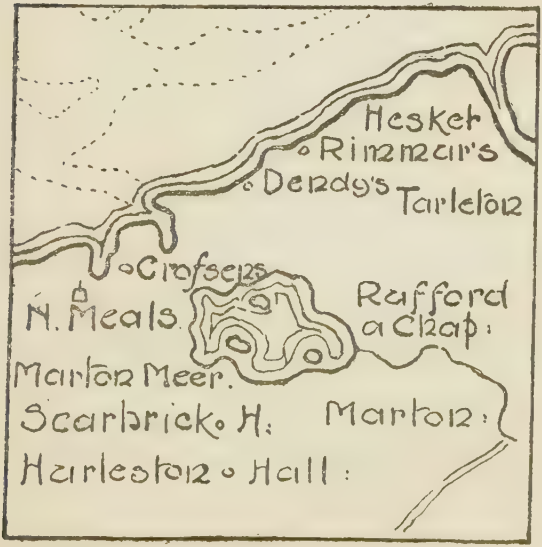
Martin Mere, between Rufford and Southport, is said to have once been the largest lake in England. Baines describes it as having been eighteen miles in circumference. Most old maps show it to have had three islands in it. These sites are now occupied by the slight elevations upon which Berry House Windmill, Wyke Farm, and Clay Brow now stand. The first two named, according to the conclusions arrived at by the Rev. W. T. Bulpit, formerly bore the names respectively of Whassam Hyle and Ottershouse-holme.

Some years ago, in the course of the excavating of one of the sluices near Crossens, an old river bed filled with silt was exposed. This was at a lower level than the Alt or the Douglas rivers at

Mere by H. Brodrick, Esq., M.A., F.G.S.



C. LEIGH: 1700:



BOWEN CIRCA 1745.

the same relative point. The discovery points to the probability that through the drainage through this outlet becoming obstructed Martin Mere formed and made for itself an outlet at the opposite or eastern end. Every old map shows it to have drained just south of Rufford into the River Douglas or Astland, as it was formerly called. At its maximum Martin Mere extended from near Crossens to Rufford.

In 1692 the first attempt to drain and reclaim the land was made, but it was not until 1850 that the many difficulties were finally overcome, and now the lake, except in times of continued rain, has practically disappeared. As many as 15 ancient canoes have been found in or near its bed, the latest find being made in 1899. The Rimmers—a name so common at Southport as to comprise fully four per cent. of the population—are believed to be descended from ancestors who lived on the "Rim of the Mere." Four hundred and eight householders of this name appear in the 1908 Southport Directory.

Other lakes in South-West Lancashire were Barton Mere, near Formby; Church Lake, east of the old churchyard; and three lesser ones, all in Halsall parish, called White Otter, Black Otter, and Gettern Mere. When these became sanded up is uncertain, but half a century ago there was nothing to show the site they occupied, unless in exceptional times of flood, except the elevated margin surrounding what are now cultivated fields. The site of White Otter Mere, shown on a map of 1786, as half-a-mile in diameter, and as lying some half-mile landward of the present Birkdale Reformatory, is marked by the White Otter Farm of to-day. Mr. Blundell, of Ince Blundell, sailed a boat upon it as recently as the year 1822. Black Otter lay to the south, and Gettern Mere to the south-west of White Otter Mere.

All these meres formerly drained east or south-east, but as the sea advanced from the west, in many instances, as in the meres at Leasowe and at the mouth of the Alt, they became breached by the sea, and were either destroyed or the new outlet became permanent.

In what is called the Palæolithic age, after the final disappearance of glacial conditions, we find definite traces of early man in Britain. Whether he had arrived during or preceding glacial times is not yet a settled question. The stone implements, at first merely rude chipped flints, and at a later period polished, which are found in caves and elsewhere alongside remains of the lion, woolly rhinoceros, brown bear, and hyena, have given the names Palæolithic and Neolithic, old and new stone, to the periods to which the flints belong. Examples of these implements of neolithic man have been found in many parts of West Lancashire; broken flints round Martin Mere; flint flakes, arrow heads, and scrapers; also polished celts and bronze spear heads. Leigh (1700) records the finding of a stone axe near Martin Mere.

Some years ago an anvil stone was found at Appley Bridge, showing that flints were once worked there. Very interesting evidences of a Neolithic settlement near the Red Noses at New Brighton were discovered in 1898 by Mr. C. Roeder. Many hundreds of broken flint implements, probably brought here from the Antrim coast, proved that here was once a Neolithic Sheffield, where stone instead of steel was the raw material fashioned into cutting implements.

Perhaps the most interesting discovery of remains was that made during the Ribble dock excavations at Preston. An astonishingly large collection of heads of the Urus were found, in addition to deer antlers, a bronze spear head, remains of whales, and two boats. The best of these relics may be seen in the Museum at Preston.

Following on the Neolithic period came the Metallic or Bronze age, estimated at about 1500 B.C., to which succeeded, about the Christian era, the Iron age in which we live.

Nothing more geologically recent than the alluvial plain of West Lancashire is known in Britain. If one journeys from Southport to Wigan, the start is made upon blown sand; the peat moss is reached at Blowick; triassic rocks lie close to the surface at Burscough and Hoscar Moss; at Parbold we reach the millstone grit; and at Wigan we are near the coal measures which overlie the millstone grit, both belonging to the Carboniferous period.

For a period reaching back into Prehistoric times sea-wear on the Lancashire, Cheshire, and North Wales coasts has been continuous, except where special causes have led to the formation of sandhill ranges. It will be the chief aim of the writer to make clear the causes which have led to this interference with the sea's advance on the sandhill sections south of Blackpool and between Southport and Waterloo, and to assign an approximate date for the reversal.

CHAPTER III.

WALNEY ISLAND TO THE WYRE.

The changes in the prehistoric period during which the sea has generally advanced on the coast-line under consideration having been dealt with in their broader aspects, the writer proposes to take the coast extending from Walney Island to Anglesey in sections, beginning at the northern end.

It is not necessary to go far back in geological time to the period when there was no bay at this part, when the coast stretched from a point some miles west of Blackpool across to some miles west of Walney Island.

Reliable information as to the intermediate changes which have taken place is scanty. One definite historical fact is that two towns or villages named Hert and Fordebottle-in-Furness—the latter a well-known place for 300 years after the

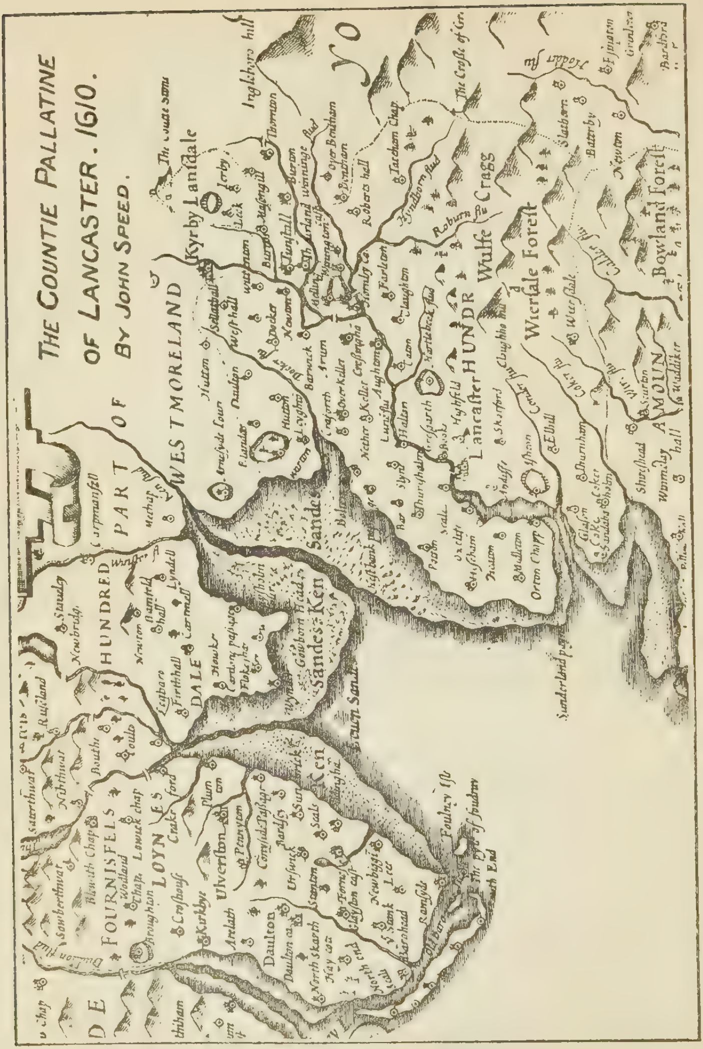
Domesday Survey—were swept away by some cataclysmic tidal wave on December 6th, 1553. Hert was an island off Dalton, probably on the west coast; Fordebottle was between Aldingham and the modern Barrow.

We have proofs of this great inundation in the recorded fact that in 1554 the inhabitants of the Isle of Walney and other places on this and the Cumberland coast made complaints to the Chancellor of the Duchy of Lancaster that on the date named a great part of the said towns adjoining the sea, by "great tempestuous rages, surges, and highe springes of the sea," was overflown by the sea to the great damage of the land, the damage extending from Dalton to the River Duddon. It was proved that 49 acres had disappeared.

Lieut.-Colonel Fishwick, in a paper read before the Lancashire and Cheshire Historic Society, gives some details of this event, the date of which is curiously near—a few months only prior to—the date of the tremendous incursion of the sea, which is said to have destroyed Singleton Thorpe, as described in a subsequent chapter.

About the middle of the 18th century the ruins of a village were visible on the sands at low water opposite Aldingham. Neither Hert nor Fordebottle, though previously mentioned in various charters, are named in any parish register or wills subsequent to 1397.

To protect the Isle of Walney from the sea's encroachments the Abbots of Furness erected



NORTH LANCASHIRE IN 1610. By JOHN SPEED.
Reproduced by permission of the Fine Art Society, Publishers of the Re-prints of Speed's maps.

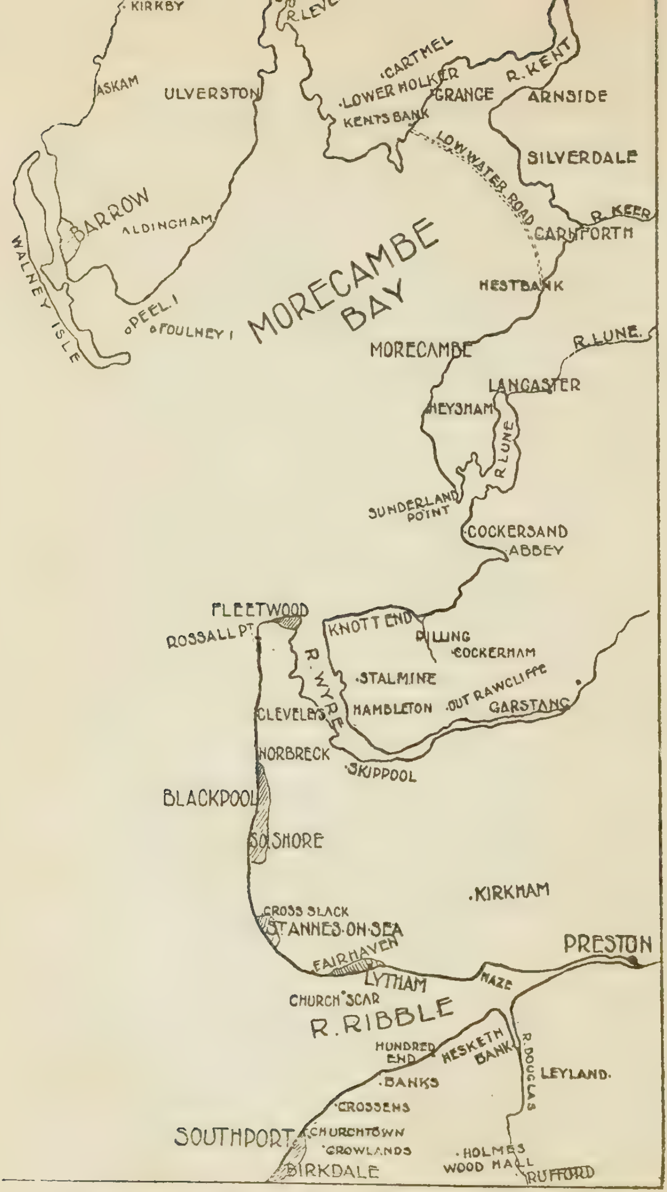
dykes. These measures were discontinued after the dissolution of the monasteries, and great loss of land has resulted. Great inundations are recorded as having taken place in the years 1771, 1796, and 1821.

A considerable part of the west coast of the Isle of Walney, particularly the southern portion, is being eroded away. The rate of the sea-wear is estimated at about three feet per year. On a third of this length of coast at the north end sand dunes have formed, and have checked the sea's advance.

At the south end of Walney Island accretion is proceeding. The lighthouse built there about 100 years ago was on the beach. It is now half-a-mile inland, the Point having become extended at the rate of nine feet a year.

Mr. F. Stillmann, M.I.C.E., in his evidence before the Coast Erosion Commission Inquiry (1906-8) gave it as his opinion that Walney Island was in olden days a part of the mainland. On Piel Island there is a ruin of an old Danish Castle, with courtyard and stables, presumably built before Walney became an island. Piel Harbour was formerly much used as a shelter by larger vessels. It is now practically sanded up.

The Aldingham coast has been encroached upon as much as a quarter of a mile in the past 100 years. The shores of Grange, Allithwaite Lower, Holker Lower, and Kirkby Ireleth are subject to erosion and accretion by turns, according to the changes in the river channels.



The Lancashire Coast (North of Southport), Present Day.
Showing places mentioned in Chapters I., III., and V.

At Grange and Kent's Bank piers were once put up for passenger steamer traffic to Morecambe. Through complete silting-up no steamers can now come near. The tide opposite Grange comes in in a bore, bringing so much sand as to seriously discolour the water. The result is a very considerable silting, as much as four or five feet having accumulated outside the railway embankment. So heavy is the sand that the cockles have been killed.

The general tendency is for the sandbanks in Morecambe Bay to get higher. Mr. T. Mellard Reade, F.G.S., is of the opinion that this is due to deposits brought by the tides coming round the north and south of Ireland, which converge here and create a maximum rise between Fleetwood and Barrow. The rivers Leven, Kent, and Keer, owing to the hard, rocky character of the formations drained by them, bring down but little suspended matter. But much of this sand doubtless is of Mersey and Ribble origin. How strong is the set of the tidal currents north of these estuaries was shown by the fact that the body of Colonel Gerard (the great grandfather of the present Baroness de Forest), who was drowned off Southport in 1822, was found nine days later some miles north of Fleetwood, on Cockerham sands.

The making of the Furness Railway along the north shore of Morecambe Bay made possible the reclamation of hundreds of acres of land in the recesses of the shore. Borings made at the time showed sand deposits to reach as far as 30 to 70 feet in depth.

Before the railway was made the usual short road over the sands of the Bay when the tide was out was from Hest Bank to Kent's Bank.

At Silverdale the foreshore is constantly changing. In recent years the old marsh has almost disappeared.

The changes in the channels of Morecambe Bay are often remarkable. Boats will be anchored on a bank, and in the course of a single night the flood tide has often so undermined the bank that the boats have been lost or overturned and sanded up.

Heysham Harbour, recently completed at an enormous outlay on the part of the Midland Railway Company, is the only deep-water harbour between the Clyde and Mersey. It has a certain and important future before it. At first threatened with a permanent silting up, a remarkable success has lately attended the efforts to create a scour past the entrance to the dock, which promises to remedy this evil.

Both east and west of Morecambe there has latterly been a considerable amount of sea-wear. At a point about half-a-mile to the west, fully 20 yards have been worn away in the last 25 years. The foreshore is decidedly lower within the same period. This is largely due to the removal for building purposes of large quantities of cobblestones and shingle which formerly acted as a protection against sea-currents. The channel has changed but little in position.

Sunderland Point, at the mouth of the River Lune, is being rapidly worn away, reducing the shelter in the estuary.

On the south side of the Lune, where the ruins of Cockersand Abbey stand, much denudation has taken place, part of the ruins having fallen into the sea.

Further south slow accretion caused by the dredging of the River Wyre is proceeding on the coasts of Pilling, Stalmine, Hambleton, and Out Rawcliffe. Blown sand lines the coast, but seldom rises into dunes.

About the middle of the 19th century sandhills existed to a considerable extent between Knott End and Pilling Lane, Breck, but erosion has almost wholly displaced them.

The main cause of this gain of the sea on this stretch is believed to have been the removal of the great boulder stones at Rossall Point in the 18th century for use as pavement for the streets of Liverpool. The L. & Y. R. have added to the mischief by also removing stones and gravel from this point.

Despite this erosion, the marsh lands at Cockerham and Pilling have risen fully four feet at the higher points in the last 40 years.

CHAPTER IV.

FLEETWOOD TO BLACKPOOL.

Crossing the mouth of the River Wyre we come to the narrow strip of land between the estuary and the open sea upon which the town of Fleetwood now stands. The beginning of Fleetwood as a fishing port dates from about 1850, when some Banks and Marshside fishermen migrated thereto in consequence of the silting up of the old direct channel between the Southport Bog-hole and Crossens.

The fact that at almost every point under the sand upon which Fleetwood has been built, diggers arrive at a shingle bed is presumptive proof that this area has been washed by the sea in comparatively recent times. All the signs point to the probability that three hundred years ago—perhaps less—the Wyre entered the sea to the west of the Mount, or quite a mile further west, than it does to-day.

Even at this period the land must have extended a mile, or even more, further west than at present.

The preva'ling strong winds and tidal currents from the south-west have steadily eroded away the Blackpool to Rossall coast, and much of this material, as well as Ribble and Mersey-borne sand, has been carried to and around Rossall Point, and has been deposited on the west side of the estuary, where Fleetwood now stands. This pushing east of this point of land has been checked by the inability of the river to wear back a hard, consolidated clay spit or bank, which runs out in a north-westerly direction from Knott End, and which is known as "The Knott." This spit continues to form the north bank of the Wyre as it enters the sea.

The clay and silt brought down by the River Wyre finds its way mainly on to the Pilling sands. Comparatively little sand comes down this river.

The present wood erection known as "The Landmark" stood in 1850 on the edge of a greensward. It replaced a former landmark which stood 100 yards nearer the sea. Since then, whilst erosion has been proceeding at high-water mark, the shore has been steadily rising.

About 1856 a bank named Tully or Providence Bank began to form at Rossall Point. It consists of stone, shingle, sand, and star-grass. It gradually extended eastwards for two miles, ending at the first Shore Lighthouse. A low promenade extended for about half-a-mile westwards of this point to the "White Houses." The gradual extension of the Tully Bank eastwards, prior to 1870, caused the tides to sweep round the end with great violence between the bank and the mainland, and eventually the Promenade and the White Houses were almost entirely swept away. Later on the sea broke through the Tully Bank about the west end of Laidley's Walk. This breach constantly tends to travel to the eastward.

Subsequently to the destruction of the Promenade the Fleetwood Commissioners, some time after 1884, erected a permanent sea wall and parapet. In 1892 another third of a mile was added, connecting this wall with the defence works in front of Laidley's Walk. The groynes between this point and the Lower Shore Lighthouse have checked in some degree the accumulation of shingle from the south, which has been enormous at this point.

Between "The Mount" at Fleetwood, with its summer-house, and the sea, there formerly ran a road now swept away, as also has been the seaward slope of "The Mount" itself.

In 1792, on the coast near Rossall, many trunks of trees could be seen, proving the encroachment of the sea. Porter, in his "History of the Fylde," mentions the case of one farm near Rossall having to be moved back from the sea's advance no fewer than four times between 1825 and 1875. The road through Rossall grounds formerly led seawards to parts now eaten up by the sea.

Four hundred Roman coins have been picked up on the Rossall beach, and may now be seen in the Preston Harris Museum.

A reference to the Fylde Roman road will be found in Chapter V.

It is easy to imagine a time when the elevation upon which the northern half of Blackpool is built, and the district immediately to the north, formed an island in a sea which would extend round the low-lying parts between the Wyre and Ribble rivers, by Marton Moss and Singleton Carrs. The struggle between sea and land is well shown in the alternating layers of sand and peat, with blue clay and silt, in these low-lying parts. There are reasons for the belief that at some distant period the Ribble flowed along this low land, leaving its present course east of Lytham, and joining the Wyre near Skippool.

The higher land is composed almost wholly of sedimentary deposits of boulder clay and gravels, interlaid with sand seams, the greater portion being the product of ice action during and subsequent to the time when the Irish Sea was choked full of ice.

A leading feature is the abundance of water-worn stones, many of them being glacier-borne from the Lake district and Criffel. As sea-wear proceeds these ultimately form a beach, which acts as a protection, at the foot of the cliffs, but not sufficiently so to prevent erosion, which has proceeded rapidly on this Blackpool to Fleetwood section as far back as records go. Since 1875, however, the erection of groynes and hulkings at various points has virtually stopped the eroding process.

At Cleveleys the coast was formerly protected by sea-walls erected by the late Sir Peter Thomas Hesketh Fleetwood, but these have now almost wholly disappeared.

Fragments of the base of the old worn-away cliffs remain in the scattered masses of consolidated drift sand and shingle below high-water mark off the Norbreck coast. Some of these are over 20 feet in length. They have received names such as the Pennystone, Higher Gingle, Lower Gingle, Carline and his Colts, Silkstone, and the Bear and Staff.

The Pennystone is a large, flat-topped rock standing about half-a-mile west of Norbreck. It can now be seen only at the ebb of high spring tides. Mr. James Pearson, of Blackpool, testifies to having seen an iron ring fixed into it when he examined it about thirty years ago. This gives support to the tradition that this stone once stood at the door of a roadside inn, and that horses were tethered to it. It was shaped as if it had steps on one side, and was black with mussels. Tradition affirms it to have at one time been the centre of a Druidical circle.

"The spot where Pennystone stood," says Thornber in his "Traditions of the Foreland of the Fylde," "was a rural retreat not devoid of beauty, though age and storms had destroyed most of the grove of oak trees which once had flourished there."

"Carline and his colts" and the "Bear and Staff" may still be seen between Norbreck and

Uncle Tom's Cabin at the ebb of high tides. Higher and Lower Gingle are no longer to be seen.

Mr. Pearson, along with Messrs. B. Bowman, of the "Blackpool Times," J. Whiteside, and the late Mr. Alfred Halstead, made an attempt about the year 1896 to discover evidences of the submerged forest and village of Singleton Thorpe, which tradition and some local historians had located at about one mile due west of old Norbreck Hall. They were well equipped with carts, implements, and labourers. The tide was the lowest of the year. Excavations were made at various points, covering a distance of about half-a-mile from east to west, the sand bank upon which the digging took place being about three-quarters of a mile from the cliffs, and to a depth of several feet. Tops of trees, apparently standing upright, were found at most of the points tested. Portions were taken away as relics. The wood was of a reddish colour. The forest was traced from opposite Norbreck to a point about half-a-mile to the north of Cleveleys. A lintel and door-post were also found.

Visitors cannot fail to have noticed how rapidly erosion has proceeded in the neighbourhood of Uncle Tom's Cabin.

On the top of the cliffs at this point there is a rather unusual feature in a bed of blown sand, about 10 feet in thickness, which has been lifted by high winds from the beach.

Another piece of evidence in proof of the sea's advance on this coast is the fact that a man still living can recall the time when cattle grazed in a field on the cliffs where the North Pier now stands. Captain Fish, of Fleetwood, used to visit, about 1850, his grandparents, who lived in one of a row of cottages on Fumbler's Hill until sea-wear caused the end to fall over the cliff. This spot was on the seaward side of the present promenade, near the site of the present North Pier.

Oak trees were growing in the early part of last century near the site of the present entrance to the Central Pier. Trunks of oaks have been found in the same locality in the making of foundations for modern buildings. Captain Bickerstaffe testifies to having seen tree-trunks near low water, off the Central Pierhead, as late as in the early 'seventies. These remains are now 18 to 20 feet deep under sand.

The whole of the shore, especially to the south of Claremont Park, has been growing steadily higher during the last 30 years, and both the high and low-water marks opposite Blackpool have been receding seawards in consequence. Captain Bickerstaffe has made careful records showing that, opposite the Central Pier, low-water mark is now 1150 feet further west than it was in 1870. But opposite the South or Victoria Pier, low-water mark has been latterly advancing towards the land. The shallowing of the water off the steamboat jetties has been proceeding for 30 years, but a slight deepening has recently been observed.

The Blackpool beach was formerly composed largely of shingle. In the year 1845 a large quantity of this shingle was removed for ballast purposes for the new railway from Poulton to Blackpool. The loss of this protective bank caused immense damage to be done in 1852 by a storm, which entirely washed away the road between the Central Pier and the New Inn, near the present Central Station.

Marton Mere, about two miles inland from South Shore, was formerly many times its present size. It has had at various times three outfalls: at Skippool, on the Wyre; at Lytham Pool; and at Spen Dyke, Blackpool.

Little Bispham Mere no longer exists, having been drained to make building land.

The black pool which gave its name to the most-frequented resort in Great Britain lay close to the Manchester Hotel.

The Fylde, the district between the Ribble and Lune estuaries, derives its name from "field," meaning an enclosure in which the trees have been felled. In this part they have for the most part been blown down by gales, when not killed by the swelling of the bog-moss. The remains of trees are still encountered from time to time in the course of farming operations.

The first known account of Blackpool ("A Description of Blackpool in Lancashire," 1789) was written by Dr. Hutton, a quaint writer, who is said to have instigated the Rev. William

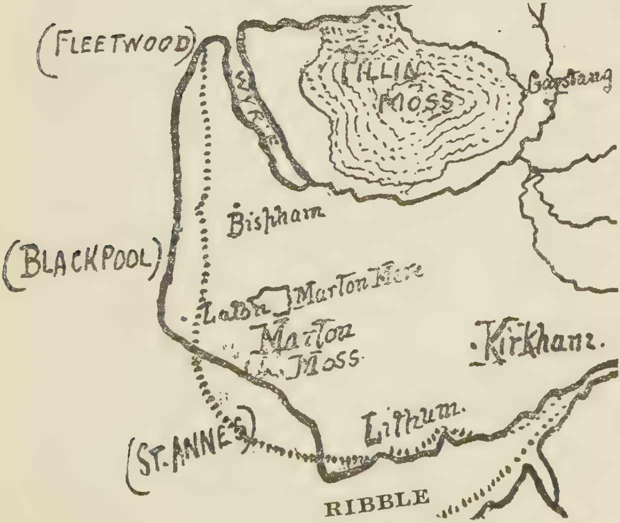
Thornber, vicar of Blackpool, to write his "History of Blackpool" (1837). Thornber's History is the sole known authority for certain reported important happenings upon this coast, and these statements have been extensively copied. Thornber gives as his authority the "Dodsworth Manuscripts," a voluminous mass of documents now in the Bodleian Library at Oxford. Their author was Roger Dodsworth, an antiquary, who married one of the Fleetwood family of Hesketh, and was buried in Rufford Church in 1654. Thornber gives neither chapter nor page of this extensive collection, and searches having failed to verify the quotations, seekers after facts must accept the statements for whatever Thornber's authority may be worth.

One of these statements is that in the year 1554, in the reign of Queen Mary, a sudden irruption of the sea overwhelmed the Rossall coast and an entire village called Singleton Thorpe was completely swept away. The inhabitants are said to have betaken themselves to, and founded, the inland village of Singleton, some miles inland. The fact that Singleton is known to have been in existence centuries before this date does not increase the credibility of this story. More of Thornber-Dodsworth in our next chapter.

The beginnings of Blackpool as a resort date from about 1750. Its first promenade, of fine gravel, was laid out in 1828. In 1856 it was extended from Talbot Square to the Hotel Metropole, and in the early 'sixties powers were obtained to further protect the front. In 1903 the great work of widening the promenade to 100 feet was commenced, and completed in 1905.

The Blackpool Corporation has been compelled to spend large sums on sea defence works. Down to 1906 this is said to have amounted to £550,000, with an annual expenditure on repairs of about £2000.

That there were dwellers upon this coast as far back as the Roman occupation may be reasonably inferred from the recent discovery of Roman coins on the present Fair Ground six feet below the surface.



THE FYLDE COAST ━━━ IN 1610 (Speed); ········ IN 1909.
Modern Towns are shown in brackets.

CHAPTER V.

SOUTH SHORE TO LYTHAM.

We come now to a section of the coast where this advance of the sea has received a check of Nature's own providing. Not only has it been checked, but the reverse process has been set up and the land is now gaining upon the sea.

There is a part of the coast at South Shore, Blackpool, at the northern end of the section under consideration, where sand-drift on the one hand, and sea-wear on the other, would seem to be fighting an even battle. This point is apparently moving north. Some forty years ago the point where at high tides the sea came furthest beyond the normal high-water mark at Blackpool was a few hundred yards north of the Victoria Pier. It is now decidedly further north, having reached a point to the north of the Hotel Metropole. So that, unless some unforeseen change occurs, the sea will continue to be pushed back by a rising shore as at Southport.

If Brazier's and Calver's Ribble estuary charts (see Chap. VIII.) are referred to, a low-water extension of the mainland, called, after the name of a vessel wrecked thereon in 1839, the "Crusader" bank, will be noticed. This has now entirely disappeared, the sand having spread itself along the Blackpool shore. The remains of the wreck are still to be seen on the north side of the Salthouse bank, which has gradually extended to the north across the former north Ribble channel.

South of the point of equilibrium successive ranges of the shingly banks locally known as "stanners" have been formed by tidal action and ranges of sand-hills by wind-action upon the sun-dried sand, which is constantly being piled up by (1) wave-action upon the beach and (2) sand of Ribble and Mersey origin. The source of the vast quantities of loose stones and gravel which compose the "stanners" has undoubtedly been the cliffs north of Blackpool, where sea erosion secures a constantly fresh supply. Many varieties of granite are found in these gravel beds. These stones would come originally from Scotland or Cumberland during the Glacial period, ice-conveyed and deposited in the Norbreck boulder clay. Being unable to cross the Ribble and Wyre rivers, the shingle tends to accumulate near Fleetwood and at and about the angle of the coast where St. Annes now stands.

Each freshly-formed bank—always on the seaward side of the previous one—would seem to be followed by an extension of the blown-sand area, also in a seaward direction. At the present time (1909) the shingle-drift has reached a point about three-quarters of a mile west of St. Cuthbert's Church, Lytham.

The writer is informed, on the authority of Thomas Fair, Esq., of Clifton Hall, Preston, that about 30 years ago, during the cutting of a deep trench along St. Annes Road, between the railway station and the sea, several wide beds of shingle or "stanners," at least four in number, were encountered. His estimate of the time required for the formation of each bank is a century, which accords with the conclusions arrived at by the writer as to the period when sand-hill formation commenced also on the south side of the Ribble.

The most landward "stanner" would be near to the inner edge of the sandhills, and would mark the furthest easterly extension of high-water mark before the sandhill growth began to push it back. It is possible that another "stanner" on the east side of the railway still remains to be disclosed. Speed's map of 1610 shows the coast-line at St. Annes to have been then about a mile further inland than it is to-day.

The present outer "stanner" of shingle began to form about a hundred years ago—a date which may be safely inferred from an estate map of 1813 date now in the Clifton Estate Offices at Lytham.

On the landward side of the outer " stanner," which up to this time had been steadily growing in size, a stone lighthouse was erected in 1847. This, being destroyed by a gale in 1863, was replaced by a wooden one, 280 yards to the north-east. This was built on a sandhill near the end of what is now Lightburne Avenue. It was pulled down in 1901, and replaced by a luminous buoy in the seaway of the channel.

The surface beds of the " stanners " are thrown into a state of travelling motion by every gale that blows, but it is believed that the range of movement is limited to the stretch of coast which lies between Lytham beach and South Shore. These " stanners " have been very effective in protecting this section from sea erosion.

In 1846, between Lytham and St. Annes Point, there was a double " stanner " just outside a bank of sand so high as rarely to be covered by the tide. Within the " stanner " was a fifty-yards breadth of flat ground bordered by sand-hills. Much of this double " stanner " at its west end was obliterated by the making of the Promenade at St. Annes; and the east end of the outer " stanner " was similarly used as a base for the new Fairhaven Promenade.

Thornber, in his " History of Blackpool," quotes as his authority the Dodsworth MSS. for the statement that a district not now identifiable formed, three hundred years ago, a part of the Fylde shore. " Dodsworth records," he writes, " that as far back as the year 1601 a thorp or village existed, named Waddum Thorp, and that even in the reign of James I., 1612, the Horsebank, now far out at sea, was a pasture for cattle." Thornber, in another part of his book, refers to this Waddum Thorp as lying south of Blackpool, and as having been swept away, along with "an extensive tract of land now termed the Horsebank," by the sea. Porter, in his "History of the Fylde" (1876), says about this village:—"History points to a hamlet named Waddum Thorp, which once stood off the coast of Lytham, fenced from the sea by a broad area of green pasture land now known as the Horsebank." "Dr. Leigh affirms that the hamlet in question was peopled by some Saxon fishermen."

Dodsworth is doubtless the original authority quoted by Porter as by Thornber, but it ought to be stated that the quotations have never been verified. The writer has made a thorough search through the elaborately indexed 161 volumes of Dodsworth's Manuscripts at the Bodleian Library at Oxford, but could find no reference whatever to Waddum Thorp.

Assuming the some-time existence of a place about which not a single other piece of confirmatory evidence is discoverable, its probable site would be on a piece of land which then projected out into the present estuary of the Ribble, forming an extension of the coast about Fairhaven. Moll's map of 1724 and Charles Leigh's of 1700 show such a projection, and Fearon and Eyes' estuary chart of 1736 shows such an extension, though at this late date a low-water extension only—fully two miles south of the present coast-line. The extreme point would reach to the north of the present Horse-bank. The name "Horse" is a corruption of "Hawes," a term applied to sandhills or waste land lying between the cultivated land and the sea. Brazier's Ribble chart of 1820-4 is the earliest map upon which "Horse-bank" appears.

The tree roots which have often been encountered in the course of dredging operations south-east of St. Annes are probably the remains of a prehistoric forest.

Mr. H. C. Crofton is the authority for the statement that storms have at times uncovered peat beds on the sandbanks across the channel at St. Annes.

In the time of the Roman occupation there are other reasons for the belief that the north bank of the Ribble extended much further south, a quite narrow estuary only dividing it from the south bank, which jutted out in a cape at or near Crossens, a name probably derived from Cross—probably a beacon on the shore for the guidance of travellers—and "Naze" or "Ness." Three hundred and fifty years ago less than three miles separated coasts now divided by 4½ miles. What remains of the present Southport Channel marks the neighbourhood of the probable course of the Ribble to the sea when the estuary was probably not a third of its present width. The fact that 78 feet of sand has been bored through at the

Palace Hotel, Birkdale, whilst 500 yards inland the peat is found a few feet only below the sand-surface, suggests the probability that the Palace Hotel stands upon the filled-up bed of the Ribble in Roman or even more recent times.

As to the date when the sea advanced to the furthest point inland on this coast, and where this point lay, there is valuable evidence in the records of a trial which took place in the year 1532. A witness testified in this trial to the fact that in his father's own remembrance (say 1425-1450) two miles of fair pasture had been "worne into by the sea." Another witness said he had heard that Kelgrymoles Churchyard was "worne into the sea 2-3 miles." "Tradition affirms," says the historian Thornber, "that an earthquake swallowed up the Church of Kilgrimol."

"Kilgrimol" was the ancient name of the district known in more recent times as Lytham Common. It extended as far north as Cross Slack, now a low-lying field about half-a-mile north of St. Annes, and immediately to the north of Nancy's Bridge over the L. & Y. railway. A cross which doubtless gave the spot its name stood here down to the end of the 18th century. The site is to the north-west of St. Anne's Church and near the boundary of St. Annes and Blackpool.

The original Lytham Church would seem to have been built here, and the evidence quoted points to the sea having washed away a portion of the burial-ground adjoining it. The spot is near the present landward edge of the sandhill range. The date when the monks left here and built a new Lytham Priory is not known.

In the course of some drainage excavations in 1893 the remains of an old road were found about 12 feet deep, near the north end of Park Road, St. Annes. It consisted of broken stone and cement, about 18 inches thick and 13 feet wide. This road may have led at some period to the ancient church at Kilgrimol.

Sandhills may have existed on this coast at a distant period, but it would not be until some time after 1500 that the larger portion of those which now line the shore came into being, and the sea's advance became reversed by sand and shingle accumulation.

The chief cause of this increased deposit of sand would probably be the moving north of the Ribble channels, which would, in earlier times, when taking a south-westerly course, be more apt, under the influence of the prevailing winds, to deposit such sand as was brought down by the river, on the North Meols shore, and such portion as was blown on to the north bank now remains only as sandbanks in the middle of the estuary.

The making of the Preston Navigation Walls, which have been gradually extended in the course of the last sixty years from Preston to a point opposite to St. Annes, have been the cause of much accretion on the Lytham and St. Annes shores. The north channel off St. Annes threatening in consequence to silt up entirely, the St. Annes U.D. Council decided in 1907 upon dredging operations with a view to keeping it open. £6000, afterwards increased to £10,000, was voted for the purpose, but a much larger sum is likely to be required.

As late as 1846 there was a considerable bay, known as Nancy's Bay, where Lytham Pool now stands. This is shown on Bowen's map, of 1720 date, as an inlet of considerable size. Marton Mere, once an extensive sheet, formerly had an outlet to Lytham Pool, probably before this was changed for exits through the "black pool" at Spen Dyke and at Skippool on the Wyre. But the coast-line at Lytham does not appear generally to have undergone much change otherwise. The fact that there is a bed of marl or clay about half-a-mile south of St. Cuthbert's Church, in what is now the estuary, which is known as "Church Scarr," suggests the possibility that it was once the site of a church. It is probable that this site would form part of the point of land which formerly projected into the estuary between Lytham and the east end of St. Annes. Eastward of Lytham there have been, following on erosion in earlier times, extensive enclosures of reclaimed land, to beyond Naze point, and as far as Preston Docks.

Lytham Pier, originally ending in the bed of the river, is now over 100 yards from the edge of the channel.

The oldest maps extant are copies of those by the Roman geographer, Ptolemy. They are not, of course, reliable, and the exact site of a Roman station called Portus Setantii, which Ptolemy places on the coast between "Moricambe" and the "Setæia," or Dee, has been the subject of much argument. By some it is assigned to an eroded part of the coast north of Fleetwood. Wherever its site may have been, there is reason to believe that the Romans had a station which stood on a worn-away point of land near Freckleton, east of Lytham. It is certain that a Roman station existed at Kirkham in the Fylde, and it is highly probable that Agricola, who marched a legion from Anglesey A.D. 79 through Ince Blundell, Formby, Birkdale, and along the coast road to a point beyond Banks, would be making for this objective, and would cross where the river could be forded. In support of this piece of history the Rev. W. T. Bulpit, who has established a strong case in favour of this site, quotes as evidence the finding of Roman coins at Harkirke, near Ince Blundell, Formby, Birkdale Common, and Hundred End. There lingers still in the neighbourhood the tradition that a Roman fort or town stood on this coast.

De Rance suggests the Portus Setantii may have been identical with Skippool, the ancient port of Poulton—once having a considerable trade—on the Wyre. The Roman road named Watling Street certainly ran from Ribchester, north of Preston, to Kirkham, and an extension probably existed south to the Naze. A Roman road certainly passed through Weeton, within a few miles of Lytham, and it has been traced north, past Burne Naze, on the Wyre, to Fleetwood, where, during the trenching for the sea-wall opposite the Mount Terrace, remains of it were found at some depth below the surface.

Pennant ("Pennant's Tours," Vol. III., p. 402) says "the situation of Portus Setantiorum is certainly at the mouth of the Ribble." Further evidence will be considered in the chapter dealing with the Mersey estuary.

CHAPTER VI.

HESKETH BANK TO CHURCHTOWN.

In the days when the Ribble estuary above Lytham was little more than half its present width there was quite a considerable traffic by the route referred to in the last chapter, the point of departure on the south side being about a mile north-east of Banks, and the ford being opposite the Naze. Here, as far back as the reign of Henry II., stood a Guide House, or place of entertainment for travellers, marked on old maps as "Ball's."

Later on the Ribble ford was apparently moved north-east to Hesketh Bank, where another Guide House, now Whitehead's Hotel, was built.

The coast road formerly ran for over five miles as far as Crossens, alongside what, down to 1860, was the foreshore. This road and the cop along its landward side date back, in the opinion of the

Rev. W. T. Bulpit, whose chapters on this coast in his "Notes on Southport and District," are valuable, at least 700 years. There are strong evidences of an old sea shore at Crossens, slightly inland of the present main road. The road at that time ran at the back of the old Rectory, which rose fully 12 feet above the shore. Beyond Crossens it was continued as a bridle-path through Churchtown, and thence it was known as Churchgate, running straight to Birkdale Common by a line east of the Rectory in Roe Lane, near St. Luke's Road and Ash Street, and across the Cemetery ground.

On this road there stood for over 1000 years, and marking the boundaries of the Leyland and West Derby hundreds, a gigantic boulder, called the "Snotterstone." The raising of this shore by drifted silt and sand caused it to become buried. A few years ago, after a long search for this stone by men set to work by the Rev. W. T. Bulpit, it was revealed. About 1850 a number of large boulders three or four feet in diameter lay at the mouth of Crossens Pool. They, too, have been lost to sight by blown sand. These would doubtless be glacier-borne wanderers from Scotland or Cumberland. The raising of the shore level has driven the high-water mark considerably seawards along this stretch. This has made foreshore reclamation practicable to the adjoining landowners. In 1834 the proprietors of the Hesketh Estate reclaimed a quantity of land, and in 1860 constructed a new sea-bank for a length of over two miles, opposite Hesketh Bank, and again a similar length 1¼ miles further out in the estuary in 1880-4. A vessel was wrecked within living memory, and washed on to the old sea-bank, near a farm called Dunkirk, one and a-half miles inland of the latest sea-bank. In all, over 6000 acres of foreshore have been enclosed between the river Douglas and Southport. A shore steadily rising through sand-drift and estuarine deposits has made this possible.

A natural stream which formerly bore the name of the "Otterpool" flows by Meols Hall and forms the lake of the Botanic Gardens. Since the enclosing of the shore at its former mouth it has been trained in a culvert, and now joins at its outlet the Crossens Sluice, which drains about 38,000 acres of land formerly covered by Martin Mere (described in Chapter II.).

Formerly these waters emptied into the Bog-hole Channel opposite Southport, but since about 1870 they cut a new channel for themselves due west, into the Penfold Channel, which skirts the Horse-bank on its north side.

Near here the Southport sewage is treated, and its purified waters pumped up above the now-elevated shore. In 1878, when the main sewer was made, the channel bed was below the sewer invert. The sewage is now held up 2-ft. to 2½-ft. higher than originally.

The present outfall marks the position of an old natural outlet of the waters of Martin Mere, which became silted up through the subsidence of the coast when the Mere water made a way for itself at its east end, into the Douglas River. Rufford is named from the ford across this outlet of the Mere, which must, therefore, be very ancient. The drainage has since the 17th century been artificially again reversed through the making of the Crossens Sluice.

The Ribble brings down immense quantities of mud from the 380 miles of glacial-drift country which it drains. The sand with which it is intermixed is deposited on the estuary banks, and on the north side of the estuary between Fairhaven and South Shore. The mud, being the lightest, falls last on the beach, chiefly on the south side of the estuary, where a thin layer of this clay, floating on the water, is deposited as the tide retreats. In time a substantial thickness of dark loamy clay, or "slutch," as it is locally called, results. An example of this kind of bed is in course of formation on the shore near Crossens. Some 50 years ago a wide stretch of this sedimentary mud, with shells, could be seen deposited on the Southport shore. It formed dangerous quicksands, some portion of which was removed at the expense of the town.

The fact that these clay deposits, all of which come with the Ribble water, now lie deep under blown sand all along the Southport to Ainsdale shore, will be referred to later, as one of the proofs of the Mersey having latterly become the dominant influence on the coast from Southport southwards.

Sugar Hillock was a slightly raised bank lying midway between the present Churchtown Station and St. Cuthbert's Church, the houses on the eastern side of Sunny Road being all built upon it. The tradition lingers that it was on the site now occupied by No. 18, Sunny Road, that the Irish vessel which was wrecked here in 1565—the bank then forming high-water mark—came to grief. Being sugar-laden, the spot became known as "Sugar Hillock." A few years ago on this same old raised bank Mr. Josiah Baker, of Southport, in the course of some excavations, came upon the skeleton of a horse tethered to a notched post. The higher ground is still well enough marked, but the general level both east and west has been much raised by blown sand since the time of this wreck. The old church itself stood on a sandhill well raised above the surrounding country. On its south side the excavations undertaken by the lord of the manor at the time of the visit of the British Association in 1903 showed the level to have been 12 feet lower than it is to-day. Meols Hall would also be built on what were then sandhills. Layers of shells have been found four or five feet below the surface in St. Cuthbert's Churchyard.

The wrecked vessel which gave its name to Sugar Hillock contained also the first potatoes ever imported into England. Curiosity caused some of the natives to plant some of them at Marshside, which hamlet can therefore claim the distinction of being the first place in England to grow the popular tuber. The claim of Altcar to be the first to grow them has been disposed of by the Rev. W. Warburton, of Altcar, who shows that the Altcar potatoes came from Marshside.

There is no doubt that the sea once washed close up to the sandhill upon which the church was built; also that "Where the bridge is, by the Gardens" (says the Rev. W. T. Bulpit, in his "Notes on Southport"), "was a ford, and a dangerous one, too, when the tide was in." This would be the inlet so clearly shown in Bowen's "Accurate Map of the County of Lancaster," bearing date 1720. In this map the coast line is particularly irregular between Hundred End and Churchtown, being broken by an important inlet, now known as Crossens Pool, as well as by a small estuary or bay between the Church hill and Crossens, into which the Otterpool emptied itself close by the present entrance to the Botanic Gardens. The lake of these Gardens is a remnant of this ancient inlet of the sea.

As late as 1863 the sea advanced at Banks during a terrible storm (recorded in Bland's "Annals") as far as the Primitive Methodist Chapel, which was completely surrounded, as was also at the same time Bankfield Farm, near Crossens Station.

The Fleetwood Arms, better known as the New Inn, was built in 1836, about the same time as a broad tract, formerly washed by the tide, was enclosed by the sea-cop which runs between Marshside Road and Crossens. The front of the hotel was paved with boulder stones taken from the Ribble bed or beach, which, down to about 100 years ago, largely consisted, opposite Crossens, of shingle and stones. This was the source of supply of the cobble-stones of which so many of the older cottages in this neighbourhood were formerly built.

In a later chapter the writer will assign reasons for the belief that 300 to 400 years ago the sea reached its furthest easterly point along the whole of the coast between the Ribble and Mersey estuaries, and was then turned back by the growth of sandhills and the elevation of the shore by drifted sand. About 1600 the high-water mark skirted Bankfield Road, between Crossens and Churchtown—then a shore road—and the bank since named Sugar Hillock, previously mentioned.

The sea cops which have been made, each a field nearer to the sea, have been as follow (the Rev. W. T. Bulpit is the authority) :—

The first sea bank started from near Pool Bridge, near the present Botanic Gardens entrance gate, and now forms the boundary of Bankfield Lane, on its landward side.

The second started at the site of the Primitive Methodist Chapel, Marshside Road, and followed the line of the West Lancashire Railway.

The third—Nab's cop—started from Marshside Road, near Baker's Lane.

Outside Nab's cop Dangert's Loan was made, and some cottages.

Then Shellfield Road, which originally opened out at the east end on to the beach.

Lastly, the Rossall men's bank was made on the sea-side of Shellfield Road. Glazebrook refers to this as in course of building in 1809.

During excavations at Meols Hall, Churchtown, the following section has been exposed:—

Blown sand—with shells.
Moss.
Sand—no shells.
Moss.
Slutch, or alluvial deposit.
Boulder clay.

In 1872, during the making of the Gasworks at Crowlands, the following section was observed:—

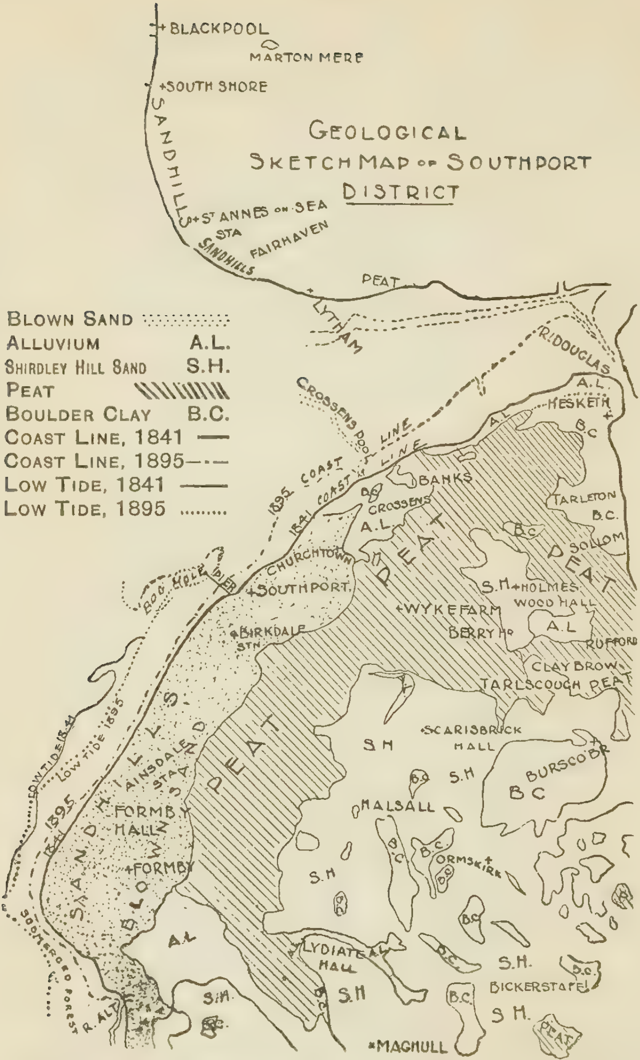
Blown sand	3 feet.
Peat	4 feet.
Grey clay (not bottomed)	3 feet.

Elk antlers and other remains of extinct animals were found at the same time; also shells—all at a depth of about 12 feet below the surface. These shells belong to a coast-line of a period long anterior to that of a few centuries ago.

CHAPTER VII.

THE SOUTHPORT COAST.

At the time when the bed of the shallow Irish Sea was elevated so as to unite the Isle of Man with Lancashire there existed, according to a well-supported theory put forward by Mr. Harold Brodrick, a large fresh-water lake, or series of lakes, which extended over the whole of the site now occupied by Southport, Birkdale, and the Horse-bank, and the hinterland for two or three miles inland of the present coast-line. It is impossible upon any other theory satisfactorily to account for the considerable quantity of fresh-water molluscs and other shell remains which are found in a bed of marl under the peat beds which everywhere underlie the blown sand deposits. The only spot where this very old marl deposit comes



SHOWING THE GEOLOGY OF SOUTHPORT AND DISTRICT.
BY HAROLD BRODRICK, ESQ., M.A., F.G.S.—1903.

near the surface near Southport is in a lane off Scarisbrick New Road beyond Zoo Park, where it crops out about 100 yards from the main road.

Becoming ultimately drained, a forest of gigantic oaks and firs, extending as far as Rufford and Burscough, sprang up on the site of these lakes. The "Bog-hole" Channel opposite Southport takes its name from this ancient forest, remains of which were at one time found in its bed. Even to-day hard, shaly peat mixed with the stems and leaves of fresh-water plants are still occasionally washed ashore between Birkdale and Formby. The size of the tree-remains point to the climate having been much more humid then than now. The black bog-oak seen in so many gardens on this coast is a relic of this ancient forest growth. At the mouth of the Alt, near Hightown, these old tree trunks may still be seen standing where they grew.

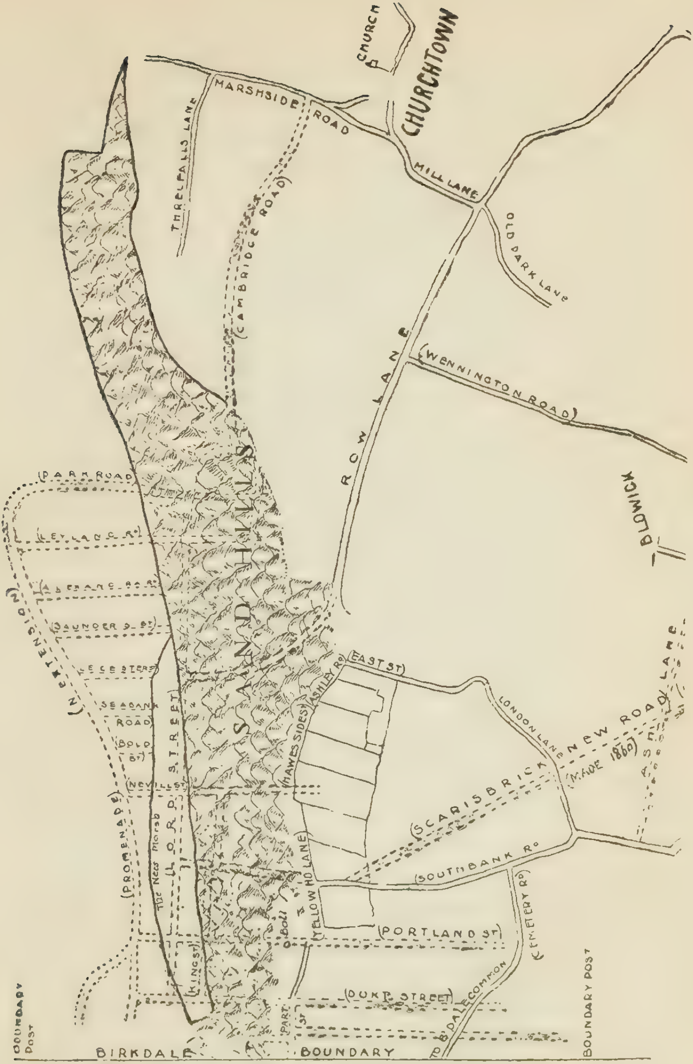
It is difficult to assign dates to these forests, but the Bog-hole forest was growing long before the time of Abraham. Since then the last great subsidence has taken place, and the peat beds, sand and silt beds have been formed to a very considerable depth.

Coming to much more recent times the conclusion to which the writer has been driven as to the date when the advancing sea reached its furthest easterly point is that it was not less than 300 nor more than 500 years ago. We may be quite sure that it was the raising of the shore by blown and drifted sand, aided possibly by a deep-seated elevation, and the formation of sand-dunes, which, constantly extending on the seaward side of existing ranges, caused a gain of the sea upon the land to be changed to a gain of the land upon the sea—a reversal still in operation. This may be stated of the sandhill stretches of coast on both the north and south sides of the Ribble estuary.

A sandhill does not necessarily mean that tidal water has at some time laved the near neighbourhood; but, speaking generally, sandhills do not form on the inner side of a coastal range, but on the seaward side. They have a tendency to spread themselves on the landward side owing to the prevailing winds, and usually develop a long slope on that side; but a hill range well defined denotes that at some period the sea has washed the shelving base of the range, or has approached it within one or two hundred yards.

The range of hills is, or has been, continuous from Churchtown to Blundellsands, about 13 miles in length by about a mile at the widest part. There is no parallel to the extent of this area of sand-dunes upon any similar length of coast in Great Britain. A map of 1565 date (see Chapter XV. for illustration) shows a sandhill range also as existing from the Alt river to as far as Garston, but this may not have been continuous.

The conjecture as to the point at which the present range of sandhills began to form on the Southport coast arrived at by the writer has received a striking confirmation by the recent



MAP OF BOLD ESTATE, NORTH MEOLS, IN 1736,
With some of the main roads in modern Southport shown in dotted lines.
Reproduced by permission of the Scarisbrick Trustees.

discovery in the Southport Scarisbrick Estate Office of a large-scale landowner's estate map, of 1736 date. This map has evidently been accurately drawn, the size of every cultivated field being exactly stated.

It shows that the statements that 200 years ago fishermen caught shrimps on the shore where now the broad and stately Lord Street runs, and that 120 years ago cattle grazed on a marsh bordering upon the same, are easily credible.

The map makes quite clear the fact that the high-water mark of 1736 touched the base of a narrow range of sandhills along the following line:—St. Paul's Square, King Street, Chapel Street, Anchor Street, Castle Street, and Lawton Street, off Manchester Road. Lord Street would almost certainly be then washed by every high tide. The change between then and now is less pronounced the further north-east we go. High tides would reach some way into Hesketh Park, then receding to a point not far from the Fleetwood Arms Inn at Marshside.

This map of 1736 gives strong support to the belief that about 170 years earlier—that is, in the sixteenth century—the shore road, or that which ran very near to the shore, would be that represented on this map as being separated from the sea only by sandhills, and sections of which road exist to-day in:—Yellow House Lane (off the upper end of Eastbank Street), Hawesside Street, and Ashley Road. Beyond this point the shore road turned inland to Roe Lane by a route now built over by the

Children's Sanatorium, between Zetland Street and Manchester Road. This road is the only one shown on the map running parallel with the beach. Roe Lane—spelt prior to 1870 "Row" Lane—took its name from a "row" of houses which stood, in 1580, at its eastern end, originally called Swift's Lane. This road dates back to the 15th century; Mill Lane dates back some centuries earlier, and is probably the oldest cart-road in Southport, the Church-gate, which is older still, having been a mere pack-road.

Between Yellow House Lane and high-water mark the range of sand-dunes were about 450 yards in width; at London Street about 420 yards; at Ashley Road about 680 yards. If they had formed at the same rate in the hundred years prior to 1736 as they did in the hundred years following upon that date, we have an ample period, without going back as far even as the 16th century, in which to account for the accumulation of the whole of the hills upon which the town of Southport came to be built. But in a later chapter reasons will be given for the conjecture that some hills existed not far from Churchtown probably six to ten centuries prior to this date, presumably of sand brought down by the Ribble when its main channel skirted the Churchtown coast.

One farmstead or cottage only stood in 1736 on the shoreward side of this ancient coast road, this being at a spot near the corner of Part and Portland Streets. Towards Churchtown the aspect becomes less unlike what has existed within living memory before the making of Cambridge Road, Denmark Road, &c. From the Nile stream to where the North Promenade of to-day now describes a convex curve, the old coast-line curved inland in a slight bay, with its apex near the Market.

The sandhills extended further out on the south than on the north side of the Nile stream, reaching almost to Lord Street West, whilst on the north side the tide would reach to about Princes Street. The explanation of this would be that sand always accumulates more quickly on the windward than on the leeward side of running water, as blown sand for the most part rolls along the ground and, falling into the stream, is carried out to sea.

Between a point opposite the New Inn and a sharp projection beyond Crossens another well-defined bay is shown, which reached at one time to Bankfield Lane. The bay between the coast opposite Churchtown and the Nile stream is also clearly shown on Blaeu's map of 1662 C. Leigh's of 1700, and another and undated map of presumably the 18th century.

The range of hills upon which the present Promenade was built would come into existence probably between 1820 and 1835. The Promenade itself was commenced in 1834, the Nevill Street to Coronation Walk section being the first to be completed.

The formation of what are locally known as "slacks," or chains of pools of fresh water between ranges of sandhills, is due to the collecting of water on a bed made impervious to water by fragments of shells decomposed by the action of carbonated water forming a limy bottom. Sand being unable to cross such slacks, the sandhills spring up on the seaward side. Hence the series of fresh-water pools which extended from Peter's Slack, at the rear of The Woodlands, near Albert Road, to the Nile stream at the Birkdale end, were the real cause of the imposing width of the stately Lord Street of to-day. The original builders a hundred years ago simply had a preference for dry foundations, and built well back on either side of the slacks of that day. South of Birkdale these slacks have in late years been drained for use as golf-links. Ream-water is the surface water of the moss, upon which moss the sand of Southport rests. In low-lying parts of the town it is only two feet from the surface.

Of the Nile stream above referred to not a trace remains. It received its name on the same day in 1798 upon which news was received of the Battle of the Nile, and at the same time as a gathering of convivial souls meeting together at the "Duke's Folly" (the original inn) gave the name of "South Port" to the little hamlet which had sprung up during the previous six years in the neighbourhood of William Sutton's wooden shanty venture, and which was the real beginning of modern Southport.

The "Nile" brook rose in Charnley's Hills, near Birkdale Common, passed by Dinorwic

House, between Kew and Stamford Roads (the bed is still discernible) to the east of Eastbourne Road, then close to the Birkdale boundary to the junction of Talbot and Belmont Streets, to the rear of St. Paul's Church, across St. Paul's Square, on the Birkdale side of West End Church, under the site of Nos. 5 and 7, Lord Street West, at the back of the "Duke's Folly," and through the grounds of Nile Bank on to the shore. It then turned north and flowed parallel with the Promenade to "The Hollow," opposite Seabank Road, and thence into the upper end of the Bog Hole. A tributary stream was the Holly Brook, which rose near Waterloo Road, crossed Weld Road near the Convent, through Clareville grounds, across Aughton Road, and through the gardens of the two houses on the west of Hollybrook Road to a junction with the Nile near St. Paul's Church.

At the Nile mouth a port is said to have once existed 11 fathoms deep, and what remained of it at the time of the christening of Southport would probably suffice to account for the choice of a name which distinguished the new port from the old North port at Crossens. But this is merely conjecture. The district was known among natives as "t' poort" long before this time.

Down to about 1849 there was a boat-building yard at the end of King Street, at about the spot where Trinity Hall now stands. Boats could, at high-water, sail up the Nile to this yard.

The father of a man now living stated that he remembered the tide finding its way into Lord Street via the Nile about 100 years ago. Another account testifies to the existence of a lake in which boats were anchored opposite the Prince of Wales Hotel in Lord Street. They reached this spot at high water from the sea about 120 years ago by the Nile mouth. The Lord Street hollow of that time would correspond with the Bog-hole Channel of to-day. The bank between Lord Street and the Promenade gradually joined up to the mainland, exactly as the Horse-bank is extending over the bed of the Bog-hole to-day.

During the excavation of the foundations of the building adjoining Parr's Bank, in London Street, a few years ago, a quantity of sea-shells, some as large as a hen-egg, were found. The discovery also of a well-worn wedding ring at the same spot is presumptive proof that the shells belong to no distant period.

As the proofs of these chapters were passing through the writer's hands a discovery was made by a Corporation foreman, Henry Brookfield, in the course of sewer excavations in Rawlinson Road, near to Hesketh Park Station, of a water-worn small piece of coal. It was found in a layer of large sea-shells, mostly whelks very little decayed. The coal was found nine feet deep, and the spot is exactly upon the inner edge of the sand-dune range, and about a mile from the present high-water mark. The section shown by the cutting was:—

Clean sand	4-ft.
Black surface soil	½-in.
Sand	8-in.
Dark sandy soil, with grass roots	4-in.
Dark sand mixed with clay (in which the coal and shells were found)	4-ft.

This discovery confirms in a striking way the belief previously formed that the West Lancashire Railway from Crossens to Hesketh Park Stations, with a landward bend to Bankfield Road, roughly marks the line to which high water reached before the present sandhills had formed. This coal would be washed up here probably in the 16th or early in the 17th century.

The lower 4-ft. is pretty certainly a deposit of Ribble sand, followed by a period of cultivation. Then the Mersey sand accumulated on the top of this.

Down to 50 years or so ago sea shells were quite plentiful on the Southport shore. The gathering and making of these shells into bracelets, necklaces, and other ornaments was quite an industry in the early days of Southport. They were also found in abundance amongst the sandhills, a few inches below the surface. One hundred and forty-five species, 103 of which were marine, could at one period be counted within a range of five miles of modern Southport. Few are now to be found except cockles, which continue to be plentiful. A mussel scour is referred to in a deed of Charles I. time as existing then off Crossens.

It has been stated, on the authority of the late Alderman Henry Robinson, that in the early days of Southport, long before the railway era, coals were brought by sea (via River Douglas from Wigan) on flats, which sailed up the Nile and a branch stream which formerly flowed at the back of " Belle Vue " (its bed is now covered by greenhouses) to Belmont Castle, a castellated building which stood down to 1883 on the site now occupied by Nos. 16 and 18, Lord Street West.

Ancient landmarks on this coast, other than the position of the sandhills themselves, are lamentably scarce. Attention has lately been called by the Rev. W. T. Bulpit to the probability that a large stone, traditionally known as " the Devil's Stone," which stood upon the Birkdale shore down to 1883, when the Cheshire Lines Railway was made, may be so regarded. It is possible that this stone, which is remembered by many people now living, and which stood nearly opposite Beach Road, about the distance of the railway away, may be identical with the base of a Cross which is mentioned in an " Inspeximus " deed of 1529 date, now in the Scarisbrick Estate Offices at Southport. The stone is about 3-ft. square in size, and had a depression or hole in the centre.

The deed, which is set forth in full in Bland's "Annals of Southport," defines the boundaries, not of the parish, but probably of the Ribble estuary at its sea-end, and within which the Admiralty rights to "Flotteson, Jetteson, Lagason, and Wrecks and all Royal fishes" are expressly waived in favour of the Lord of the Manor.

The boundaries are described as "from the Cross in the Hose in the Town of North Myles as far as Snotterston." The rights referred to are said to have been in existence since the time of William the Conqueror, and, presumably, the boundary marks as well. If Mr. Bulpit's conjecture is correct, this "Cross in the Hose" would in Norman days stand amidst the low Ribble-borne sandhills, which during the next few hundred years became either worn away by the sea's advance or obliterated by the Mersey-borne sand, the later origin of which will be explained in the chapter dealing with the Mersey.

Some fifty years ago, in the course of drainage excavations in Birkdale, a human skull, wrapped in cloth, was found 10 to 12 feet below the surface. This was no prehistoric relic, but had doubtless been washed here by the tide when the sea came further inland, and prior to the drifting of the sand over this part.

The following interesting section was cut through at North End, Birkdale, in 1868, with a view to brick-making. (The venture was abandoned).

Dark blown sand and vegetable matter	3½-ft.
Light fine sand	2½-ft.
Dark grey-blue sand	3-ft.
Peat, brown colour	9-ft.
Seam of hazel and sea-wood	
Black dense peat	
Grey estuarine clay, with shells	20-ft.
Coarse red Shirdley Hill sand	1-ft.

CHAPTER VIII.

The Southport Channel.

As previously stated, there is reason for the belief that the Ribble formerly entered the sea by a course wholly on the south side of the present estuary, the north bank extending south probably as far as the present Penfold Channel. Old maps show a gradual widening of the estuary, as later times are reached, especially below Lytham and Crossens.

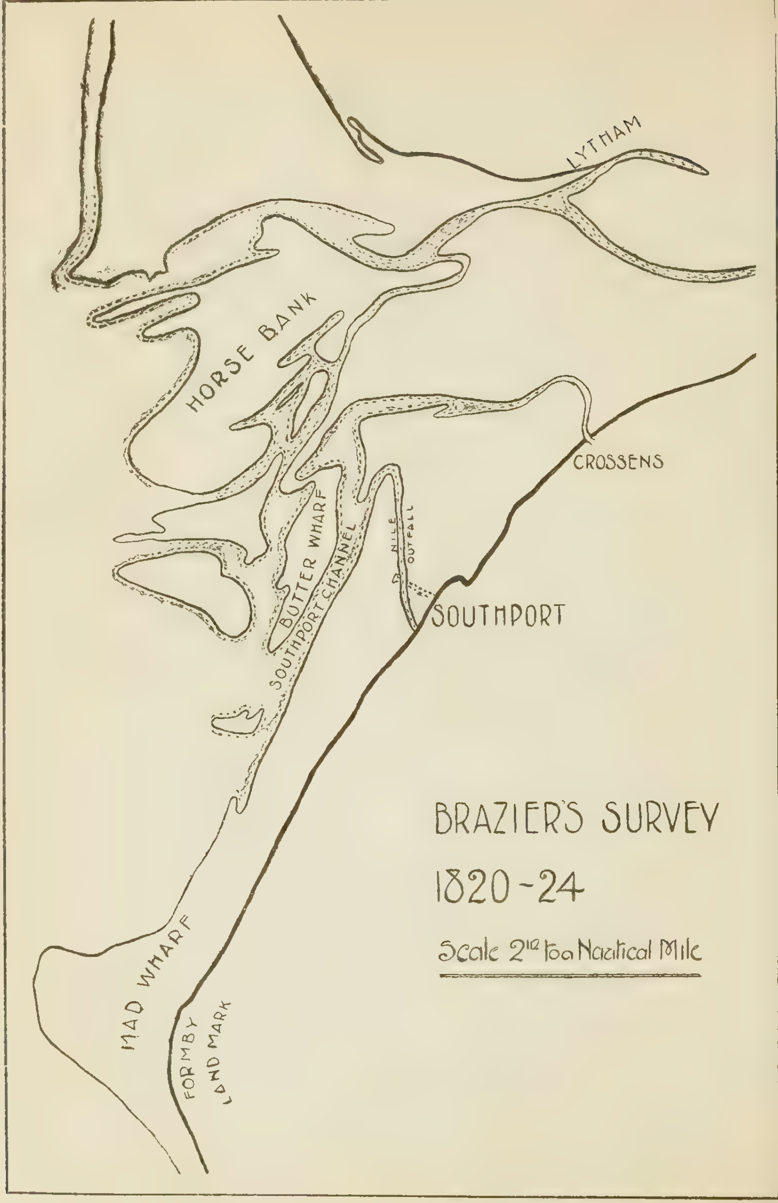
In 1870 a boring was made for water for the Palace Hotel, Birkdale. The following section was disclosed :—

Sand (blown sedimentary)	78-ft.
Peat and cyclas clay	1½-ft.
Red marl	45-ft.

Yet a few hundred yards inland the peat comes within a few feet of the surface. This points to the probability that the Palace Hotel and the buildings in line with it stand upon a filled-in former bed of the Ribble. If sand has accumulated on this shore in the past at the same rate as at the present time (12 feet per century—see later), we need not go back more than 700 years to account for the 78-ft. found at this point.

The Ribble channels have been extraordinarily unstable. The South or Bog-hole Channel has been by far the most permanent feature, though its position and width have varied considerably. A centre channel leading into what has been latterly called "The Gut" is found in most charts, and a north channel has at frequent intervals passed near to the St. Annes shore.

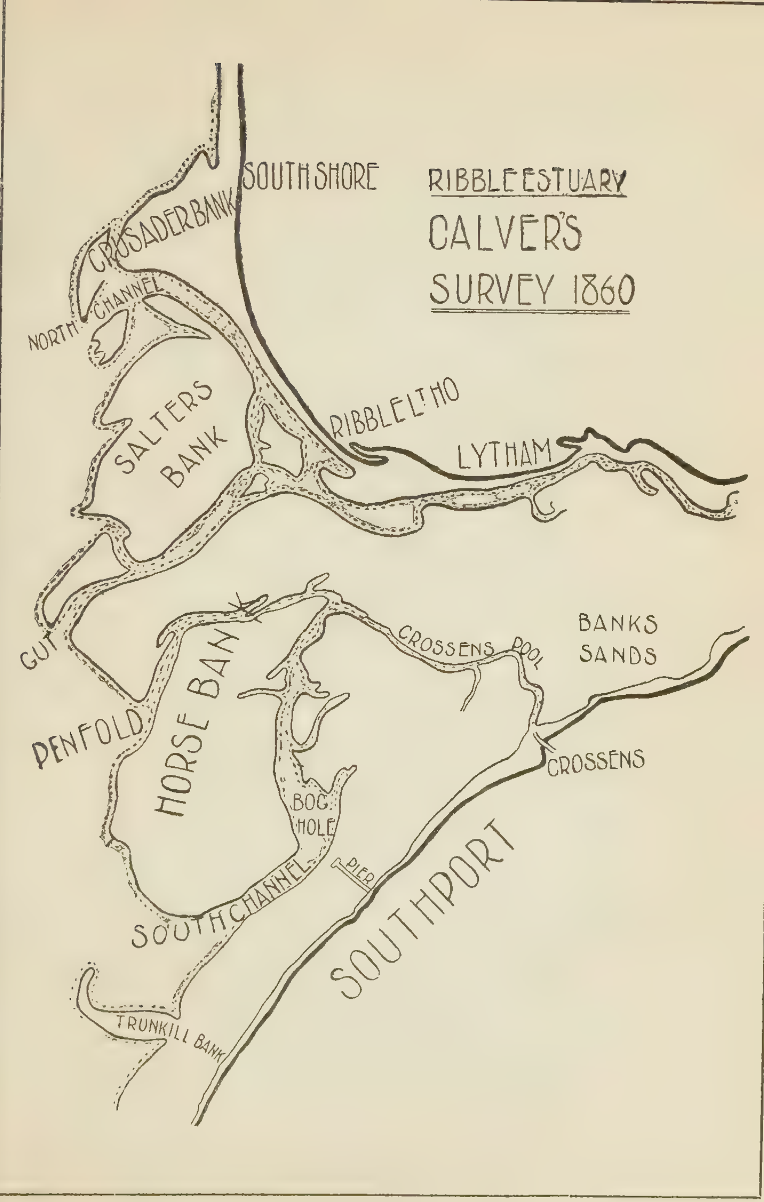
For the past seventy years the story of the Ribble estuary is the history of the repeated attempts of the town of Preston to secure a ship waterway to the sea, and of the attempts of the authorities of St. Annes, Lytham, and Southport to protect their shores from the feared consequences of the Ribble training walls. These walls were commenced by the Ribble Navigation Company, a land-reclaiming as well as a navigation enterprise, under powers obtained in an Act of Parliament in 1837. In 1845 training walls were made four miles down the river, and the south wall was extended a further four miles in 1853. In 1883 the Preston Corporation assumed the responsibility of completing the work, and a further extension took place in 1885. Further powers were obtained in 1889, 1895, and 1905 to extend the north and south walls. By this time about 1½ millions of money had been sunk on an enterprise which had so far done little but add to

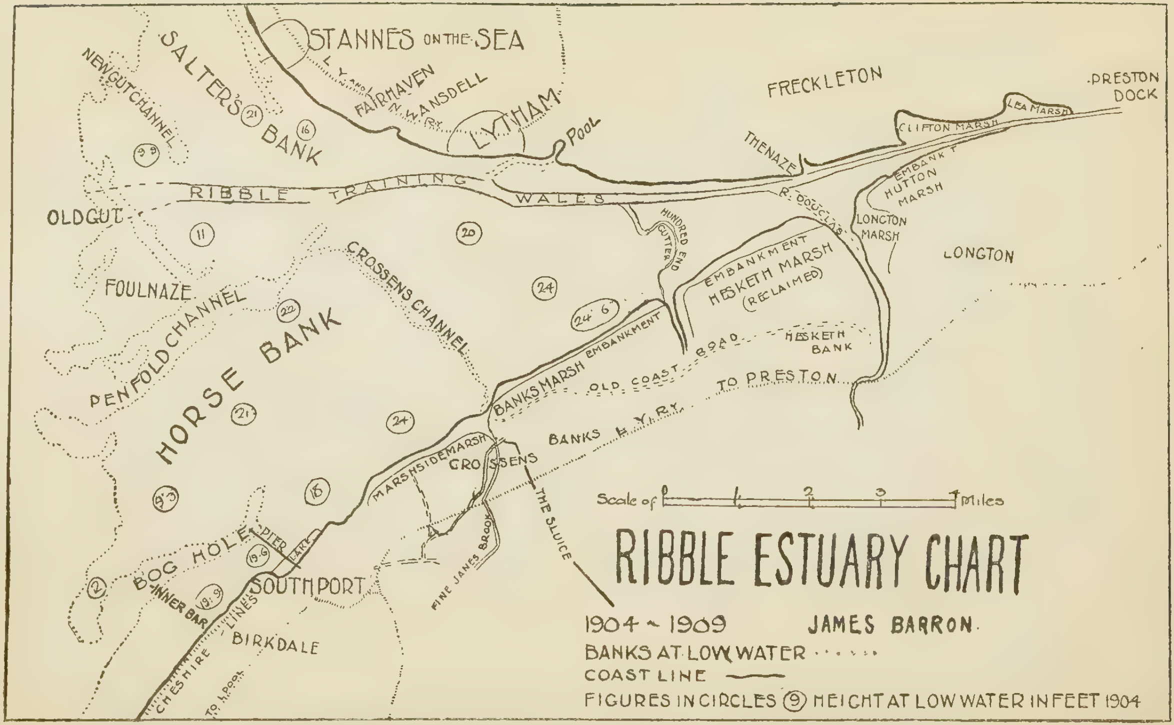


BRAZIER'S SURVEY

1820-24

Scale 2$^{\text{in}}$ to a Nautical Mile


RIBBLE ESTUARY
CALVER'S
SURVEY 1860
SOUTH SHORE
CRUSADER BANK
NORTH CHANNEL
SALTERS BANK
RIBBLE Lt HO
LYTHAM
GUT
PENFOLD
HORSE BAN
CROSSENS POOL
BANKS SANDS
CROSSENS
BOG HOLE
PIER
SOUTHPORT
SOUTH CHANNEL
TRUNKILL BANK


RIBBLE ESTUARY CHART
1904 ~ 1909
JAMES BARRON.
BANKS AT LOW WATER
COAST LINE
FIGURES IN CIRCLES ⑨ HEIGHT AT LOW WATER IN FEET 1904
Scale of Miles
1
2
3
4
PRESTON DOCK
LEA MARSH
CLIFTON MARSH
FRECKLETON
THE NAZE
EMBANK T
HUTTON MARSH
LONGTON MARSH
LONGTON
R. DOUGLAS
ST ANNES ON THE SEA
L. Y. AND L. N. W. R.Y.
FAIRHAVEN
ANSDELL
LYTHAM
Pool
SALTER'S BANK
NEW GUT CHANNEL
RIBBLE TRAINING WALLS
OLD GUT
HUNDRED END GUTTER
EMBANKMENT
HESKETH MARSH (RECLAIMED)
HESKETH BANK
OLD COAST ROAD
TO PRESTON
BANKS L. Y. R.Y.
BANKS MARSH EMBANKMENT
FOULNAZE
PENFOLD CHANNEL
CROSSENS CHANNEL
HORSE BANK
MARSHSIDE MARSH
CROSSENS
THE SLUICE
FINE JANES BROOK
BOG HOLE
PIER
LAKE
INNER BAR
LINES
SOUTHPORT
BIRKDALE
CHESHIRE
TO L.POOL
⑨·⑨
㉑
⑯
⑪
⑳
㉔
24' 6"
㉒
㉑
㉔
⑮
9·3
19·6
19·9
②

Preston's growing debt. Its rates are now (1909) 9s. 2d. in the £.

Serious consequences to Southport's Bog-hole Channel were confidently predicted from time to time as certain to result from this concentration of the Ribble water into one central channel, especially by Mr. Vernon Harcourt, who gave evidence against the Preston Bill in 1883. The training of the Crossens stream into the Bog-hole in order to increase the tidal ebb-scour was recommended as a remedy. At this time the Crossens stream, which drains 38,000 acres of land around Martin Mere, and into which the purified effluent of the Southport sewage also flows, entered the sea through the Packet Heading —a channel which formerly lay between the Horse-bank and the Penfold.

Prior to this time the Bog-hole had always had a connection with the main Ribble channel or the Crossens stream, or both. The Lytham channel connecting it with the centre Ribble channel had been steadily deteriorating from about 1820, until about 1882 a direct daily steamer summer service between Southport and Lytham had to be entirely suspended through the virtual disappearance of this channel. The connection with the Crossens stream, which had found a way to the Penfold further north, was lost a few years later, since which time the Bog-hole has become a blind channel, and the worst predictions about its deterioration have been in continuous course of fulfilment.

The Southport Town Council prepared a Bill in 1885 to obtain powers to carry out the recommended remedy of the reuniting of the Crossens stream with the Bog-hole, but owing to the refusal of the owners of the land drained by the Crossens stream to co-operate with the Southport authorities, except upon too onerous terms, in carrying out the scheme, the clauses were withdrawn, and in the intervening 24 years nature has been allowed a free course.

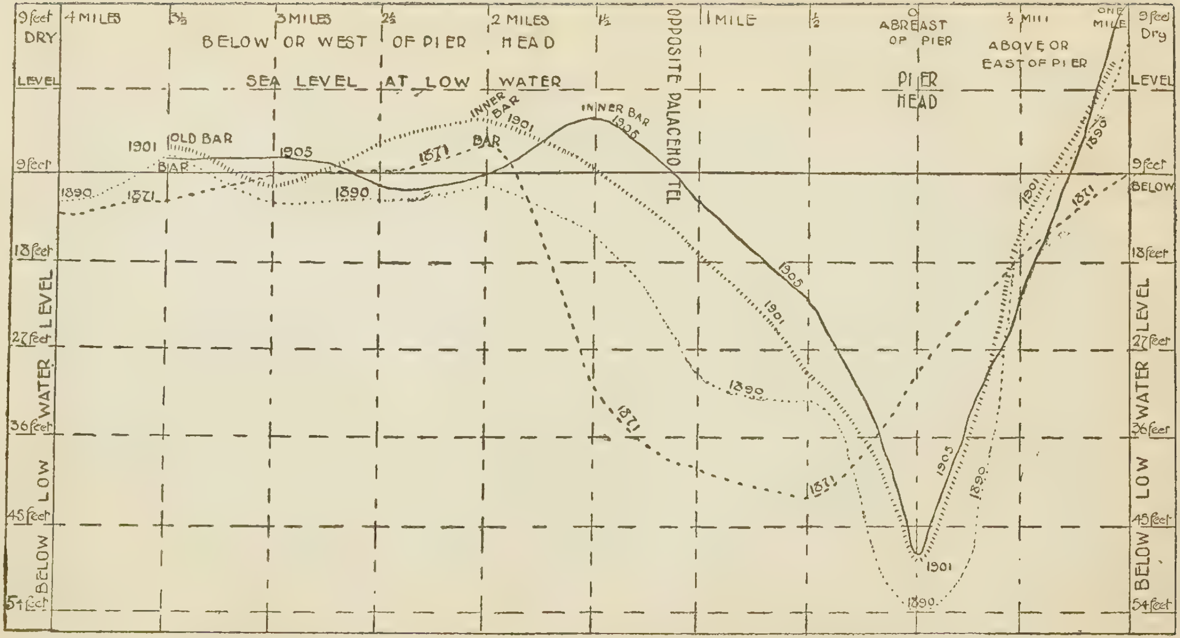
About 1886-90 the head of the Bog-hole channel was about 1½ miles from the Southport Pierhead. In 1898 it was little more than a mile. At date of writing—February, 1909—it is little more than half-a-mile. In width it shrank opposite the Pier from 682 yards in 1867 to 330 yards in 1885, since when it has not varied greatly, though its position tends to move shorewards. This is caused mainly by the sand which blows across the Horse-bank falling into the channel on the landward edge of the bank, thus filling up the channel on this side. In 1907 the Horse-bank had advanced to within 208 yards of the Pierhead. It is now filling up on the shoreward side.

Whilst shallowing on all sides is rapidly proceeding, it is curious to note that the deep basin which has always existed opposite the Pierhead has persisted with only slight changes. The cause of this is the deposit of quantities of stones by the Pier Company on the east side of the Pier, the object being to protect the Pier foundations. This has promoted sand deposit by checking the speed of the tidal ebb and flow at this point. The current being deflected seawards causes a scour through increased speed, and the deep hole is consequently maintained. The following chart shows the depth here to have been greater in 1905 than in 1871. The deepest part is now just north of the Pier end. In 1908 it was two feet deeper in a small area here than is shown in Parson's Chart of 1890.

About 1902 an inner bar of sand began to form about 1¼ miles below or south-west of the Pier-head. Twenty feet of water was the depth here prior to this date. In 1906 it had shallowed at low water of an ordinary Spring tide to two feet only. The water at the old or outer bar has for some years been deepening.

The explanation of the formation of these channel bars is that on the receding of the tide the ebb is temporarily held up on the turn of the tide, and the resulting stationariness is favourable to the deposit of the suspended matter which is brought in by every tide. The amount deposited is, of course, the difference between the quantity brought in by the flow and that taken out by the ebb-tide. For a channel to be kept free from silting it is essential that the ebb rate should be at least as rapid as the flow. In this case the tide takes a decidedly longer time to ebb than to flow.

The blown sand, which every south-westerly to westerly gale deposits in such quantities on the Birkdale and Southport foreshores, is the sole



SOUTHPORT CHANNEL SOUNDINGS · 1871-1890-1901 - 1905

(Showing the Vertical Contour of the Bog-hole Channel).

foundation for the statement that the sea is leaving Southport. The extent to which the whole shore has been raised has resulted in reclamations of land amounting to as much as 6000 acres having been made possible between Birkdale and Penwortham.

Commander Jarrad, R.N., who was engaged by the Preston Corporation to draw up a report upon the causes of the silting of the Southport Channel, arrived at a conclusion which, in one finding, was clearly a confusing of cause and effect. It was these reclamations, according to this report, which had reduced the volume of tidal water and, in consequence, the strength of the ebb scour. But the raising of the shore had been in progress long before any land had been reclaimed, and the reduction in the tidal scour would have been practically the same had no embankments been made along the coast, the tide but seldom approaching these banks, excepting on the Birkdale Esplanade.

This report, which was issued in May, 1908, omits all mention of what are in all probability the two principal factors in the recent changes in the Southport Channel and on this coast generally. These are :—

(1.) The Preston training walls have so well achieved their purpose as to leave an insufficient volume of water to keep open the St. Annes and Southport Channels; especially harmful to the strength of the tidal scour in the Bog-hole have been the walls which have diverted the Douglas water into the Preston Channel; and

(2.) The straitening and deepening to a depth of 27 feet, by 1500 feet in width, of the Mersey Channel by the dredging of an enormous quantity of material, this resulting in the bringing out to the neighbourhood of the Mersey bar of an increased quantity of suspended sand by the natural action of the strengthened flow of the Mersey. The greater distance the river-borne sand is carried out, the more easily it is acted upon by the tidal currents and drifted on to the Formby, Southport, and Fylde shores.

This increase in natural action as a secondary effect of the artificial deepening of the Mersey Channel has probably been as important a factor in the raising of these coast-levels as the enormous quantity of material deposited by the dredgers, down to 1907-8, north-west of Formby Point.

The effect of the removed material being deposited by the dredgers down to 1907-8 north-west of Formby Point is, in the writer's belief, exaggerated in this report. It is a contributory, not a main cause. Dredging does not affect the total amount of sand at the Mersey mouth, but it causes it to be more easily acted upon and drifted into the Bog-hole by the tidal currents.

The actual amount of sand and mud dredged from the Mersey Channel, and from the shoals in the Queen's and Crosby Channels, between 1890 and July, 1908, was nearly 85 millions of tons. The average cost, as shown in a paper read before the Institute of Civil Engineers by Mr. A. G. Lyster, M.I.C.E., in 1899, was for the year 1898, including wages, supplies, repairs, superintendence, and working expenses (no allowance for interest or depreciation), 0·61d. per ton. The Mersey Harbour Board's expenditure on dredging averaged, for three years, £20,000 per year. A comparison of the surveys made at various times since 1875 shows amazing changes.

The Southport Pier is the only standard by which the rate at which the rise of the Southport shore can be measured, apart from tidal soundings. An observer of the pile-driving when the Pier was made in 1860, Mr. T. H. Hodge, of Southport, testifies to the rise having amounted to 6-ft. 6-in. near the seaward side of the Marine Drive in the intervening 49 years. This means an average increase of height through blown and drifted sand of more than 1½ inches per annum. The rate has increased in recent years. Measurements of the height of the under-girder of the Pier 12 yards to the seaward side of the parapet of the Marine Drive showed, in May, 1906, a space of 15-ft. In February, 1909, the writer found this had decreased to 13-ft. 11-in., showing an average highering of over 4-in. a year. In a few years' time ordinary spring tides will fall short of the Marine Lake.

For the purpose of future comparison, the height of the Pier under the sea end of the tram-road was taken on the same date, and was found to be 25-ft. 5-in. from the shore to the under-side of the main girders.

Sand-drift has been materially accelerated by the turning of the old Nile stream, about the year

1876, into the Lord Street sewer. This stream, emptying itself upon the shore opposite Duke Street, washed the sand blowing from the south-west into the channel, which it entered down to 1850 opposite Seabank Road.

In 1807 a great storm is said to have wrought such a change that the old port at the Nile mouth was abandoned, and the shore opposite the end of Nevill Street became the port for boats. As late as 1860 Captain Bickerstaffe, of Blackpool, testifies to having landed passengers from a boat within 30 yards of the Victoria Hotel Nevill Street entrance.

The elevation of the beach has gradually extended from the south northwards. In 1840 the force of the tide was greatest—that is, the beach was lowest—opposite the Winter Gardens; in 1860, opposite "Claremont"; and now, though less marked, it has moved as far north as the Convalescent Hospital.

The Horse-bank is also rising. In 1890 James' Brow, 1½ miles seaward of the Pier end, was 18½-ft. above ordnance datum, and Great Brow, two miles to north-west, was 22½-ft. It is clearly destined to join up to the mainland, just as a channel which, according to Mr. Mellard Reade, F.G.S., once existed close in shore between Formby and Southport, silted up; just as the old Formby channel, upon which the port of Formby stood; and just as three channels upon which St. Annes is built became in turn sanded up.

A comparison of the 1896 ordnance map and

Barron's of 1904—both reliable charts—shows an extension in a southward direction of the Horse-bank, the south end at the later date turning in toward the land.

A consideration of the whole of the facts compels the enquirer to conclude that the probabilities are against the town of Southport being able to retain permanently a navigable way to the sea, except at a more or less heavy cost in dredging operations. In the time of Queen Elizabeth the coast, instead of being convex in form, as now, was curved slightly inwards, so that a person at Crossens Point could probably see an object on Formby Point, though further inland than it is to-day. Sand drift is solely accountable for the filling up of this hollow, and there is not a single redeeming factor in the situation which is likely to reverse the present tendencies. Whether the diversion of the Crossens stream into the Bog-hole would save the situation is very doubtful, the volume of water being so inconsiderable. Dredging at the bars can at best only postpone the final filling up of the entire channel. The Penfold channel will cease to be the way to the Preston channel when the planned extensions have been completed in 1910. The present south wall entrance will then be closed.

For the shrimping industry the prospect is somewhat serious. In another few years the Pier will probably be unapproachable at low water. The deep hole near the Pier will probably take a much longer time to fill up, but deposit is inevitable when this part forms the head of the channel. The Southport and Marshside boats are said to form the finest fleet of half-decked fishing boats to be found round the British coasts.

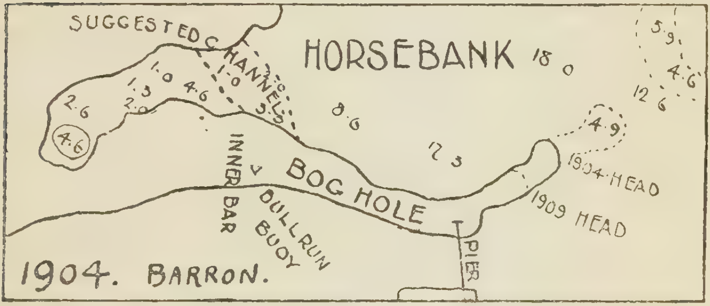
An estuary chart of 1809 date confirms the truth of a statement made to the writer by the son, aged over 60, of a fisherman who told it to him, that about a hundred years ago Crossens fishermen could sail their boats up to Crossens by a channel which ran not far from the North Promenade extension, and thence parallel with the shore.

The Ribble water has long ceased to be the chief shaping influence on the Southport coast. As the Mersey becomes deepened and straitened by dredging it will become more and more the dominant factor on this coast.

Obviously the best policy for Southport is to secure amalgamation with Birkdale with a view to extending the borough on the seaward side, perhaps on to the Horse-bank itself, and so securing a sea front where deep water is more likely to be permanent, and with a more westerly aspect. But wherever the new promenade is made sand will continue to accrete, and a substantial sum for its regular removal will probably come to form a fixed item in the borough budgets of a not distant future.

A gentleman who has frequently been called before the House of Lords Committees as a tidal expert specially familiar with the Ribble estuary recommends the dredging away of a new channel across the south end of the Horse-bank (Spencer's

Brow), where it now averages only two feet above low water and about half a mile across. This would lead into the channel just above the inner bar, and would form the best assistance to the ebb and flow of the tide in a natural direction.



Suggested New Channel Across Horsebank.
The figures show heights above low water.

The cost of this, he states, would not be half so great as that of the plan recently adopted by the St. Annes U.D.C.

The Southport foreshore, first on the south side and a little later on the north of the Pier, will, if no remedy be found, be ready for building upon within the next twenty years. Then will come a unique opportunity for the architects and land surveyors of the time to exercise their imaginations in laying out in novel and attractive fashion, some hundreds of acres of ground on the sea-front of an existing watering-place, an opportunity without known precedent in the history of seaside resorts.

CHAPTER IX.

LOST ARGARMEOLS AND AINSDALE.

No more perplexing task confronts a writer on the subject of these chapters than the determination of the boundaries of the ancient manor of Argarmeols. Two statements concerning it may, however, be made with confidence: that it lay on the coast between North Meols and Ainsdale, and, secondly, that the village, or land of that name, had been wholly or in part swallowed up by the sea some time in the 14th century. The proofs of its existence are to be found mainly in the charters of Cockersand Abbey (near the mouth of the River Lune) and in the records still preserved of more than one lawsuit in which land in Argarmeols and ancient Aynesdale was the subject of dispute.

In reading over these records one is struck by the large number of names of places—they may be hamlets, farmsteads, or homesteads, we cannot say what—which cannot conceivably have any reference to places now existing. The conclusion that they are now covered by the sea, the shore, or the sandhills, and that they all lay somewhere between North Meols and Formby, or on the seaward side of these limits, is a perfectly safe one. The following is a selection of such names: Meandale, Romsdale, Anoldisdall, Springwale, Brownhill, Sheephow, Winscarth-lithe, Melcanrehow, Atefield, Quitemeledale, Selefures, Alserhow, Gripnottes, Birkedene, Ravenskils, Halsteadhow, Tongland, Stardale, Oddasargh, Butterclinning, Greendale, Scatherwolmer, Waingate, Narrowdale, and Bleshowdale.

Most of these places are mentioned in connection with land-grants by the owner to the monks of Cockersand Abbey. No fewer than 45 of these deeds relate to ancient Aynesdale, which in the 12th and early in the 13th centuries must have been a town. It is often referred to in the deeds as a "town"—of much greater importance than its modern namesake. One deed describes "A herdsman's hut in Stardale, with the land attached, and also an acre of land in Ainsdale, half an acre of it being between the town and Romsdale."

The word "dale" will be noted as common to many of these names. It does not mean a "vale," but a small holding or strip of land. A "dole" of money comes from the same root. Birkdale, the earliest mention of which is in a deed of 1295 date, is a corruption from " Birchdol," meaning the portion of land upon which birches grew. Its spelling mutations are many: Byrkedale, Birkdall, Birthille (1736), Birkedale, &c. Its local pronunciation by many natives is still " Birt-tle."

Between the 12th and 16th centuries the boundaries of Birkdale, Argarmeols, and Ainsdale are impossible of determination. Argarmeols is believed by Farrar (" Lancashire Pipe-rolls," 1902) to have formed part of the modern township of Birkdale. He also thinks (" History of North Meols," p. 94) that at the end of the 12th century Birkdale and Ainsdale formed a narrow strip between Formby and Argarmeols.

A study of the changes on this coast inclines one to a different conclusion, namely, that Argarmeols lay on the seaward side and Birkdale on the landward side of that section of the coast lying between North Meols and Ainsdale. Repeatedly in lawsuit records the places are separately mentioned, as in an agreement relating to the pasturage of cattle (1377) "in Northmeles, Aynaltesdale, Byrkdale, and Argarmeles." Again, in 1311, another deed refers to half of Birkdale and Bretherton as belonging to one, and a third of a knight's fee in Arkmell and Bretherton to another.

At the time of the Domesday Survey Argarmeols, therein referred to as " Erengermeles," formed the whole of a manor, with probably the same approximate boundaries as the Birkdale of to-day.

Argarmeols certainly had a more restricted area in later days, as proved by the evidence in two lawsuit records. An inquisition of 1404 date refers to the Manors of Argar Meols and Birkdale. Another document shows that in 1503 Sir Henry Halsall, lord of the manor of Halsall, Birkdale, and Argarmeles, was sued for rent due to the King. Sir Henry deposed that "the said Argarmelys and all the lands and tenements in the same are and were at the decease of Hugh Halsall (his father), and long before," "within the hegh see and drowned and adnichilate with the sayd see, and oute off the lawgh water marke, and also oute of the bodye of the said Countye."

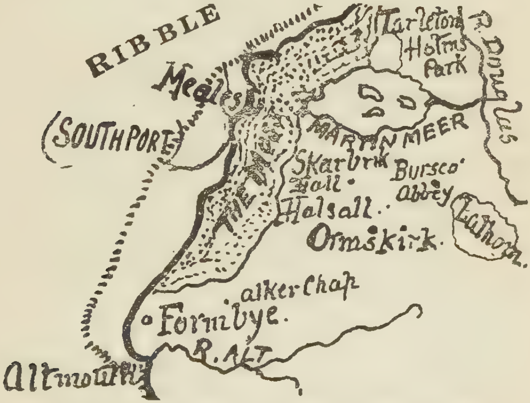
John Shirlok, aged 80, also stated in evidence that he had never known Argarmelys, but he had "hard say that suche londes there were and drowned in the See." It was also stated by another witness that "the Abbot of Cockersand possessed great lands within four miles of Halsall worn into the see." Sir Henry won his case, and no more dues were paid for Argarmeols.

In another trial which took place half-a-century later, in 1553, in which Sir Henry Halsall's son was the plaintiff, evidence was put in to show "that there was a certain town in time past called "Aynesdale, which said town, time out of mind, "has been and still is overflowed with the sea, so "that there remains no remembrance thereof."

The evidence as to the boundaries of the lost land of Argarmeols and ancient Aynesdale points to the probability that Argarmeols, subsequent to a portion of the Domesday manor of Erengermeles coming to bear the name of Byrkedale, became restricted to a portion of the coast between North Meols and modern Ainsdale.

Mr. W. E. Gregson, of Great Crosby, who has made a systematic inspection of the Formby and Blundell Estate title-deeds, is of the opinion that it may have been, and probably was, the name of a strip of land on the coast stretching from about Birkdale to Formby, and that it may have been separated from the mainland by an extension of the old Formby channel, or joined only at the north end. One of Mr. John Formby's deeds of 1282 (or earlier) refers to Argarmeols in connection with a Hyfin Bridge, which may have connected this detached land with the mainland.

But the theory which has the most probability about it is that a gradual subsidence of moss land had taken place, such as is taking place to-day behind Southport and Crossens, and on the Moreton and Bidston plains in Cheshire; and that some specially high tide broke through the intervening higher ground and permanently covered both ancient Aynesdale and Argarmeols. The date of this inundation must have been at some time in the early part of the 14th century, probably between the years 1311 and 1324. But it is shown in other chapters that the sea's advance on this coast must have been fairly constant down to about the reign of Elizabeth. That the date of the great inundation was not later than 1346 is determined by an entry of this date in a Cockersand Abbey deed: "Otto de Halsall for the fourth "part of one knight's fee in Argarmeles, which "is now annihilate by the sea, and there is no "habitation there."



The Coast Line Between Banks and Formby, ——— in 1610 (Speed); .... 1909.

How far the coast extended seaward of its present line at any period prior to this date we have no data to go upon. But if the sea-wear or possible subsidence, having a like result, proceeded prior to the formation of the sandhill ranges at the rate at which it has proceeded on the Cheshire coast, the Lancashire coast-line may well have been, at the time of the Conquest, further west than at the present time. But by the year 1600 the writer's estimate is that high-water mark had advanced along the Birkdale and Ainsdale coasts to a point not far removed from the present L. and Y. Railway. This point will receive further consideration in a subsequent chapter.

Mr. Mellard Reade, a high authority, is of the opinion that a deep channel ran from the old port of Formby to Southport, separating a long bank from the mainland, only a few hundred years ago. A chart of 1736 date shows such a channel, and the Crossens stream in connection with the main channel.

At some time this bank would probably be inhabited land, just as the Burbo and other tidal-covered banks at the Mersey mouth, and the Hoyle Bank, opposite the Dee mouth, are said to have been in Roman days or later.

There is no room for doubt that the remains of Argarmeols and of ancient Aynesdale lie under the sandhills, or under the coast now washed by every high tide.

The general fact that under the conditions prevailing on this coast, sandhills change their position but slightly on their landward side, the growth being almost wholly on the seaward side, has been already mentioned. The position of the Liverpool main road between Birkdale Common and Ainsdale, near the Reformatory, tends to confirm this belief. Here the road curves a little, and probably originally did so, in order to avoid the sandhills on the seaward side. The position of this road is the same in the oldest road maps extant as it is to-day. Then, as now, it marked the inner edge of the main sandhill range.

At one point in the neighbourhood of Bedford Road and the Isle of Wight farm at Birkdale there is a notable exception to this rule. A spur running east from the main range, called Charnley's Hills, has formed on the landward side of this road. This exception is not easy to account for, unless it be the absence of any running brook which in so many parts forms the landward edge by intercepting the blowing sand.

The hills referred to are subject to sudden changes. In March, 1907, a high hill near Bedford Road disappeared in a single night's storm.

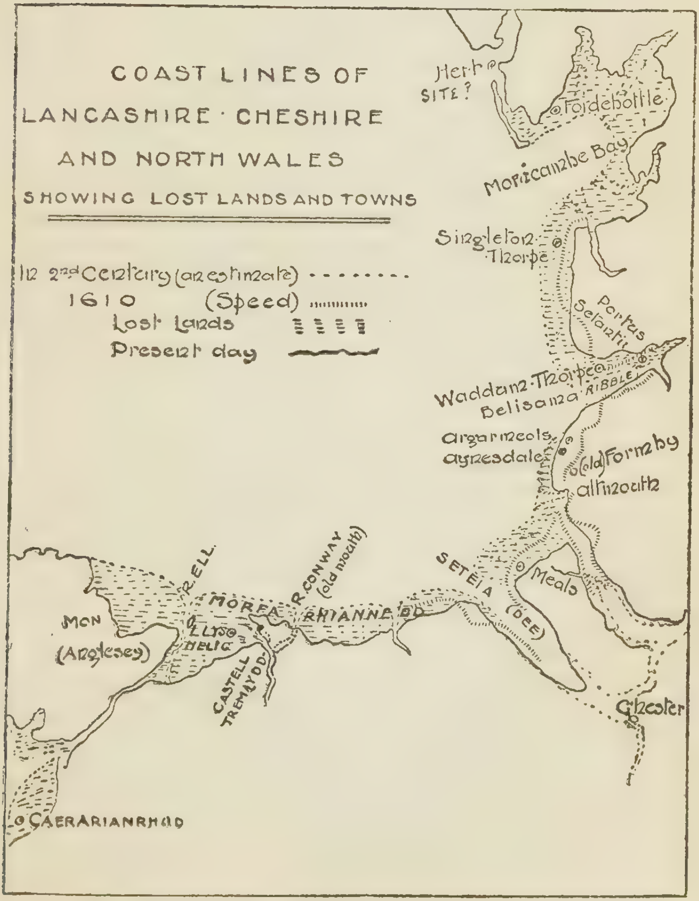
The "Lost Farm" which Roby, in his "Traditions of Lancashire," associates with a story of an incident in the rebellion of 1745, stood on the borders of Ainsdale and Birkdale, adjoining the sea-side of the L. & Y. Railway. As late as 1822 a portion of it was still uncovered by the drifting sand.

CHAPTER X.

THE FORMBY COAST.

The history of the coast from Ainsdale to the Alt River is in the main that of the Argarmeols and Ainsdale coast, except that blowing sand, rather than an invading sea, has been the chief destroying agent. The stretch includes Formby Point, which has, ever since the Mersey found its way to the sea by its present outlet, formed a salient between the Ribble and Mersey estuaries, and has accordingly offered particularly favourable conditions for sand accretion. At no other spot, probably, on the whole British coast is an area of blown sand three miles in width, from low water to the landward edge of the sand-blown area, to be found. And yet the statement, originally made, it is believed, in an early volume of the Geological Memoirs, that "in 1690 there "were no sandhills at Formby," if correct—and it is quite credible, shows that the coast-changes here have been greater than on any part of this coast.

Here, again, the order of change since the days of the Conquest has been (1) moss and mere, (2) invasion by the sea, and (3) sandhills pushing back the sea. This probably applies to the whole of the width now under sandhills.



It would be difficult to find a district where blowing sand has inflicted so much loss upon farmers and landowners, nor upon cultivated land only.

The decline of Formby as a port dates from about 1705, when the channel began to silt up and the bank gradually joined up to the mainland. The immediate cause of this would probably be a change in the course of the Mersey, part of the scour of which this channel previously had had the benefit of.

All the traditions of the neighbourhood support the belief that the old town of Formby stood on the edge of a channel which ran between a long tidal-covered bank and the mainland. That a harbour stood here has latterly been disputed, chiefly by negative evidence, such as its non-appearance in the "Herald's" map of 1598 date.

Whether it was a harbour, a pier, or a mere jetty which existed here may be open to question, but there is evidence that there was one or the other in the following statement sent to the writer by a close student of, and probably the best living authority on the Formby coast, Mr. John Formby, of Formby Hall. He says:—

"At that time (about 1711) there was a fishing "hamlet and a pier which is said to have stood "some 600 yards north-west of the present St. "Luke's Church. (It was Canon Hume, I think, who placed it here.) I have it at second hand from "the Rev. Robert Cort that his old friend, when "a boy, saw the troops embark at Formby pier,

" to go to quell the rebellion in Scotland. Now
" this must have been in the '15, not the '45, for
" in the thirties of the 18th century the place was
" destroyed by sand. I have heard that there
" was a great discussion whether the Docks
" should be built at Liverpool or Formby about
" 1700."

This change in the Mersey channel would probably be due to the making of the first docks at Liverpool in 1705, or to the training walls which probably were laid down some years earlier. The consequences to the Formby-Southport coast were momentous indeed, if the theory which has been set forth in a later chapter is a well-founded one.

The Rev. Robert Cort was, at the time above referred to (1787), curate of Formby, and died in 1856. The statement of the old Formby man above referred to was made by Mr. Cort to Canon Gray, who told it to Mr. Formby. This old man is said to have been the last inhabitant of the deserted town. He lived in a lone house on the verge of the burial-ground, and he declared that in his youth his father's house had stood in the centre of the old town of Formby. As a boy he had been used to jumping from the pierhead to the decks of ships that were loading in the harbour.

About 1730-40 the old town had become overwhelmed by blown sand. The last house disappeared about 1739.

A close scrutiny of the evidence raises doubts as to whether the pier and harbour stood on the sea front at all. It is more probable that it stood somewhere within the shelter of the Alt estuary, probably near its mouth when the river entered the sea further north than at present.

The old port or fishing hamlet was probably the objective of a well-defined and important road, which appears on Bowen's map of 1720, and which crossed from Bolton and Wigan and through Ormskirk to the coast at this point. This is the only east and west main road shown as reaching the coast between Preston and Liverpool.

In 1662 the usual route taken from Liverpool for the north was through Formby, and by this road, though its course cannot now be defined with certainty.

The writer is informed by Mr. Formby that he knew an old man, aged 80, Robert Smith, a great character in his day, who said in 1860 that when he was a boy there were hardly any sandhills at Formby. The way to Southport was then not by the present road—then only an occupation road—but over the golf links at Freshfield and over a few sandhills on to the road along the shore.

There is no doubt that the original Formby Church—or "Chapel," as it is named in a Harleian map of 1598 date—stood not far from the sea, and that it was blown down in a great gale. In 1746 part of the material was removed about a mile and a-half inland, and used in the building of St. Peter's Church, Formby, now known as the "old church."

In 1855 St. Luke's Church was built on a site adjoining a huge sandhill and abutting on the site of the old church. The old gravestones may still be found at a depth of about eight feet. At the west end of the church a number may still be seen. The pathway through the sandhills, which old residents will recollect (it existed from as early as 1746 to 1859), was known as Church Street, and formerly led to the original church.

Church Mere, a small fresh-water lake, formerly stood near the site of the old church, but became sanded up.

There is preserved in the records of the "Historic Society of Lancashire and Cheshire" a valuable paper on the changes about Formby, which was given by Mr. Hume some 40 years ago (1866 volume). His investigations brought him to the conclusion that there are four distinct surfaces:—

"1. 'The Moss,' which is shown on maps of 1588 and 1610 date.

"2. Cultivated land, with streets of the town, a park, orchards, &c.

"3. Sand, which buried the streets and much of the land under cultivation from about 1750 until 1850.

"4. Cultivated land recovered from the sand, especially by Mr. Fresh (from whom Freshfield takes its name). A stratum of vegetable soil is placed over the sand, on which now stand modern villas and gardens."

"The Moss" referred to above was probably identical with that which is shown in eight ancient maps as extending from about a mile north of Formby Point to North Meols, and in one or two maps it is shown as joining on to Penwortham Moss, beyond the Douglas. Trunks of trees which grew near this moss remained, according to Mr. Hume, "to our own time" (1866). Fully half the surface—the western half—formerly occupied by this moss is now covered with drifted sandhills.

The name of Formby appears in the Domesday Survey (1080-86), and in most old maps as Fornebei. The name is a Danish one, and would probably be given to the district by the Danes, who, it is on record, were the earliest "summer excursionists" to the coasts of Lancashire and Cheshire early in the ninth century. Customs have changed, for then it was the excursionists who did the plundering. What could be appropriated was carried back to Denmark and Norway. It was not until about 840—in the opinion of the Rev. William Warburton, of Altcar—that they wintered here.

CHAPTER XI.

THE RIVER ALT TO SEAFORTH.

The manor of Raven Meols is that part of Formby which lies to the north of the Alt River. There is every reason to believe that at least half of this district was inundated and lost some time in the 13th century, but it may have been the same extraordinary tidal incursion which wiped out Argarmeols and Aynesdale, early in the 14th century, which wrought the mischief here. Its name is associated with the Raven flag of the Danes, and " Meols " is presumptive evidence of sandhills having been here long before the present hills were formed. They would probably disappear in the great inundation.

Canon Hume brought to light documentary evidence showing that Raven Meols, the district between Formby and the Alt river, was overwhelmed by sand and only one house left uncovered in 1565. Raven Meols Lane is now for the most part deep in sand. There is little doubt that it formerly led to a comparatively populous district now covered by a desert of sandhills and the Altcar Rifle Ranges.

Down to about 1700, and certainly as late as the year 1660, the River Alt had a wide funnel-shaped mouth, which opened out to the west. It must have been a tidal estuary of some importance. Down to fifty years ago boats could still be sailed to fishermen's houses two or three miles above the present sand-narrowed mouth. There is an old house in Liverpool Road, Formby, called "The Waterings," once accessible from the sea, and where vessels were loaded and unloaded. Near this spot the contractor for the making of the Formby sewer found, in 1907, an old spring and clearly-marked deer footprints about 15-ft. under the present land surface; also evidences of the tidal estuary having extended to this point. Mr. Formby is of the opinion that the Downholland brook opened into this estuary, also by a wide inlet, which extended perhaps a mile north from the Alt estuary, and on the landward side of the present Liverpool road. By this tidal creek the Danes are believed to have sailed up when they made their successful attack upon the Formby people in King Alfred's day. A map of 1598 date clearly shows the then funnel-shaped mouth of the Alt and the Downholland creek. Sea-shore clay may be seen near "the Waterings" and also further north.

The place near the present mouth of the Alt known as Ballings Warp or Wharf is said to have been the point where vessels trading with Formby threw out their ballast.

The late Rev. Lonsdale Formby could remember the time when the tide came over what is now Altcar Rifle Range, right up to the flood-gates, and the point south of the Lifeboat House, nearly opposite "the Promenade," extended some hundreds of yards into what is now sea. On this point the old brick landmark stood. This is the only place on this coast where the sea has encroached in recent years.

The old round lighthouse, so well known to travellers on the railway, near which it stands, was originally built as a landmark then close to the shore, and was only fitted with a light for a short period. The newer lighthouse had to be built about a mile further west to be equally near the sea.

The Grange, near the mouth of the Alt, is a noted old manor house originally built by the monks of Cockersand Abbey in 1290, and subsequently a residence of the Molyneux family. Here we have clear evidence as to how much greater the accretion has been north than south of the Alt river.

Ince Blundell, which means Blundell Island, was at some distant period an island, at all events in the neighbourhood of the Hall.

A place marked Altmouth, generally believed to have been a small town, appears on most old maps on the south side of the Alt entrance to the sea. It is shown on Morden's map, 1700; Blaeu's Atlas Major, 1662; Moll's, 1724; and Blome's, about 1671; Saxton's of 1577; Jansson's map of 1646; and an unnamed map of 1610. The latest map upon which it is marked is Tunnicliffe's Lancashire map of 1789. In Cary's of 1793, and in every later map, it does not appear, and the inference is that it became buried in sand about this time. There is a tradition that the same causes which made Formby for a time a port, ruined Altmouth. But doubts have been cast upon the existence of any town at all at this spot. Mr. W. E. Gregson, of Great Crosby, who has gone into the evidence, is of the opinion that the ruins of houses discovered in the making of Crosby sewer some years ago were the remains of a small hamlet called "Moorhouses," the existence of which is proved by certain Crosby and Blundell title-deeds. A misleading statement in Camden's "Britannia" may have started the erroneous belief about a town having stood here.

The remains of the submerged forest may be well seen about a mile to the south of the mouth of the Alt. The sea is constantly revealing fresh trunks, whilst the old break off or are covered again by the shifting sands. They consist chiefly of oak, hazel, birch, and pine. They are rooted in Scrobicularia clay, and their position is proof of the subsidence of this part of the coast since the time when the trees grew here.

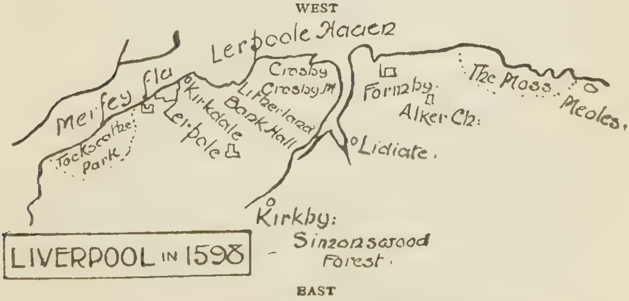
The westward edge of this ancient forest has been traced by the Rev. W. Warburton and

Mr. Formby as running north-east from this point between Formby and Great Altcar, and across the moss to Shirdley Hill.

In the making of the Formby sewer in Raven-Meols Lane, trunks of big trees were found at a depth of 10 to 12 feet.

In October, 1908, during the progress of sewering operations, forest remains were found at a depth of about 10 feet at Waterloo, both in South Road and Wellington Street.

De Rance has pointed out that this Alt forest must have been older than the Roman occupation, Roman coins having been found in the alluvium on the top of the same. The depth to which the bed has been submerged at this part cannot, he says, be less than 30 feet. It is certain also that the Scotch firs, oaks, yews, willows, and birches cannot have grown very near to the sea. We may, therefore, safely assume as the period when these trees grew a time when the coast-line extended as far out as it probably did in the Neolithic period.



South Lancashire Coast in 1598.
From a Harlæian Manuscript.

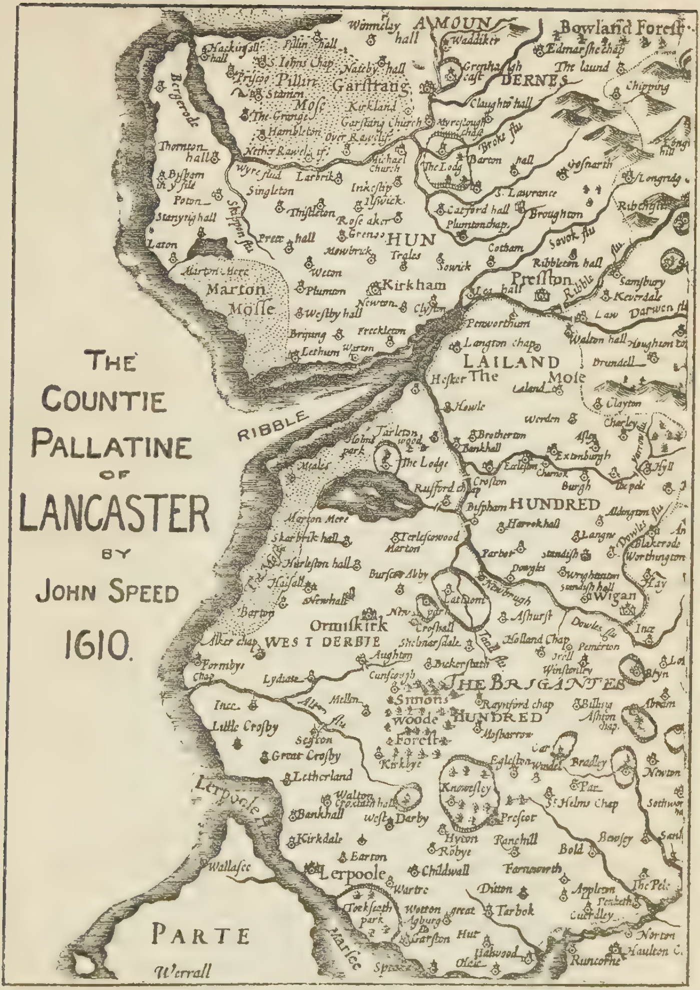
About 1860 the surface of the ground at the mouth of the Alt was of firm sand, so that wheels passed over with ease; now the sand is largely washed away and the turf bog exposed.

The erosion which is proceeding south of the Alt is due to the river turning south, close in shore, thus causing an eating into the sandhills. The change of its course from a westerly outfall probably dates from the joining up to the mainland of the Formby bank, about 1700.

Mr. T. Mellard Reade has testified before the Coast Erosion Commission to a loss of about 44 inches per annum having taken place from this cause during the last 43 years along a third of the Great Crosby coast. But over the other two-thirds there is a gain of about the same amount, namely, 42 inches per annum. The dredging of the Mersey has tended to prevent further accretion.

At "The Green," Blundellsands, the high-water mark has receded seawards no less than 46 feet since 1866. This loss of shore continues in a diminishing degree until the Alt river is neared.

A bay of considerable depth, reaching apparently as far as the village of Litherland, is shown on two maps of 1598 and 1696 date. The Rimrose brook at Seaforth probably marks the centre of this bay. In 1815 hundreds of tree stumps, remains of the submarine forest, could be seen at this point. Some of them remained down to about the year 1868.



South Lancashire in 1610 by John Speed.

By permission of the Fine Arts Society, publishers of the Re-prints of Speed's Maps.

CHAPTER XII.

WHERE DID THE LANCASHIRE SANDHILLS COME FROM?

It is proposed at this point to make a digression from the sectional examination of the coast changes in order to consider the important questions (1) as to where all the sand which lines this coast has come from, and (2) the special causes which have piled up these Lancashire hill ranges.

There have been three sources of origin:—

1. Sea-eroded material on the Cheshire and adjoining coasts.
2. River-borne material from interior sources.
3. Tidal-borne material from more or less distant parts.

When the fact is borne in mind that Liverpool Bay and adjoining lands have been hollowed out from the Great Orme's Head to the Cumberland coast, to an extent that would be apparent at a glance had we an authentic map of Julius Cæsar's day before us, the first-named source of origin at once comes into view. The extent of the land wastage on the Cheshire and North Wales coasts will be dealt with in a subsequent chapter.

The chief source of origin of the Lancashire sand-dunes is undoubtedly the second-named, namely, river-borne material from the higher-lying parts of the Penning Range and its outlying spurs, whence the Rivers Ribble, Mersey, and Irwell, and tributary streams take their rise. The careful and repeated microscopic examinations made by Mr. Joseph Lomas, A.R.C.S., F.G.S., of Birkenhead, of the sand grains prove conclusively that they are of the same millstone-grit formations as still form from 50 to 700 feet in thickness of the higher parts of Whernside, Penyghent, Ingleborough, Blackstone Edge, Kinder Scout, and other parts of the Pennine Range. High up the sides of these hills may be seen, in places, exposed sections of this formation. The question, "What has become of all that vertical section which once connected these hills?" is answered by the question which heads this chapter.

Since this series of rocks was laid down, in the Carboniferous period, they have been uplifted between one and two thousand feet, and they are now again being denuded to form the bottom of the Irish Sea, and, in part, to form the range of dunes under consideration.

The constituent parts of these rocks, silica, quartz, &c., are insoluble. If they were soluble, like the Wealden clays and chalks of the Thames basin, the Lancashire sandhills would have been on as insignificant a scale as the mounds at the mouth of the Thames. Still, there is a considerable amount of soluble solids also brought down the Lancashire rivers, as much as 400,000 tons being carried down annually by the Ribble alone, according to calculations made by Mr. E. Dickson, F.G.S.

The deposit of the resulting clay beds on the Crossens shore has been referred to in the " Banks to Churchtown " chapter. It is broadly true to say that the mud or " slutch " of the Crossens to Ainsdale coast comes down the Ribble, whilst the sand deposited on the south of the estuary comes almost wholly from the Mersey. Some clay is also brought down by the Mersey and Alt rivers, thin deposits being found usually overlain by sand on the Raven Meols and Crosby shores.

The Mersey is formed by the junction of the Goyt and Etherow rivers, above Stockport. Of the 765 square miles which it drains down to its meeting of the tide above Warrington, 270 miles are of the soft new red sandstone formations, and the remainder of the harder millstone grit and of the coal measures.

A very small proportion of grains of the Triassic strata traversed by the Mersey in its lower reaches are found when microscopically examined, in comparison with those of the millstone-grit formations in which the Mersey, Irwell, and other tributaries take their rise. The larger part of this river-borne material is deposited in sandbanks in the Dee, Mersey, and Ribble estuaries, and in river-bars which mark the point where the river current loses its force and the suspended sand becomes deposited. Sea currents, tides, the sun, and winds do the rest in piling up the sand in dunes along the north-western shores of the Mersey and Ribble.

The sea on the Lancashire and Cumberland coasts receives a larger drainage of water than any similar length of coast in Great Britain, being equivalent to about one-fourth of the whole. From the ancient Silurian rocks of the Lake district little or no sand or other material is carried.

It is the generous contribution of eroded material by the Rivers Mersey and Ribble which has caused the gain of land to be greater here than anywhere round our coasts, save perhaps in the neighbourhood of "The Wash," on the east coast. Serious as have been the inroads of the sea, chiefly on the east and south coasts, the net balance between loss and gain, as regards the whole of England and Wales, has been, in the last 35 years, one of gain to the rateable value of the country of 30,000 acres.

Admiral Denham in 1837 calculated the quantity of matter held in solution in the Mersey estuary as being 330,000 cubic yards on the flood tide and 379,000 cubic yards on the ebb tide. The difference between the two amounts represents the river's contribution to the raising of the coast and sea-bottom. Such figures give point to the remark of a wit on hearing them—"The quality of Mersey is not strained."

The amount deposited outside the Mersey estuary alone has been estimated by another authority at 11½ million cubic yards per annum.

The powerful steam dredgers maintained by the Mersey Dock Board form an artificial contributing agency of considerable importance. So much removed material, deposited where it is more easily acted upon by tidal currents, unquestionably tends to increase the sand accumulation not only upon the Waterloo to Southport coast, but also upon the Fylde coast. Rubbish and other matter unquestionably brought down by the Mersey is often found on the Rossall coast.

The latest-built Mersey dredger, the "Leviathan," with four 42-inch suction pumps, can dredge to a depth of 70 feet and load itself with 10,000 tons of sand in 50 minutes.

The huge expenditure on these monster dredgers has been justified in the results, and by Liverpool's pre-eminence as a great world-port. One-third of the United Kingdom's shipping and no less than a seventh of the total shipping of the world belong to it; and a third of the export trade of the United Kingdom passes through it.

Another important source (No. 3), in the opinion of Mr. Mellard Reade, F.G.S., is ocean-borne material from a distance. The tides coming from the Atlantic, and divided into two sections by Ireland, meet and create a maximum rise at Fleetwood and Morecambe Bay. The shallowness of the sea on the Lancashire coast Mr. Reade attributes largely to the sand thus deposited. His theory as to the Lancashire sandhills is that they are due in the first instance to the advance of the sea on a subsiding coast-line.

The contention that the Pennine Range is the main source of supply does not exclude the probability that ocean-borne material forms a part of supply, but it would seem to be a very minor part. The same can be said of the theory that the Lancashire accumulations are simply the tidal-borne results of sea-wear on the Cheshire coast.

CHAPTER XIII.

CONDITIONS OF SANDHILL FORMATION.

The causes tending to the formation of sand-dunes, which have been dealt with in the preceding chapters, have never been adequate to account for the extent to which they have been piled up on the Lancashire coast. If they were adequate, far more of the British coast would be lined with them, for rivers, tidal currents, a drying sun, and winds are to be found more or less everywhere. Some causes which appear either to have been overlooked or insufficiently considered by previous investigators in this field are here put forward.

It is in no one or two causes, but in the combination of the following seven conditions, every one of which is present on the sandhill sections of the Lancashire coast and nowhere else in Great Britain, that we find an adequate explanation for the piling up of these millions of tons of sand :—

1. Contiguity to mouths of rivers, draining districts of millstone grit and kindred geological formations.
2. Nearness to a coast on the windward side, as regards prevailing winds, which is in process of marine denudation.
3. A low, flat shore. The more gradual the fall, the greater the distance between high and low water, and the more ample the time for the sand to be dried by the sun.
4. A coast of insoluble geological formation, such as true sand—not of clay, chalk, or hard rock.
5. The growth of star-grass or other vegetation.
6. A coast in general line with, or but slightly inclined to, that of the prevailing winds.
7. Sea-wave action, which breaks up the surface of the shore, and is constantly carrying up sand from below low-water towards high-water mark.

The cause numbered 1 was considered in the last chapter. Nos. 2, 3, and 4 are self-evident. No. 5, the growth of star-grass, is of sufficient importance to merit treatment in a separate chapter.

No. 6 is a condition of considerable importance, though apparently unnoted by previous investigators. It is not an essential, but is an important factor. The most favourable direction for the prevailing winds to strike a coast is at an angle of about 10 or 15 degrees, and for the following reasons:—If the prevailing winds came from off the land, no sand would come from ploughed fields, moss, grass, or woodland country. If they came directly off the sea, the tidal surface, being usually exposed for too short a time between the tides for the sun to dry it sufficiently, comparatively little sand would be lifted by the wind. But when a gale strikes the coast at a slight angle it obtains its maximum power to translate sand from the foreshore.

When sandhill ranges are found of any considerable extent, this condition will invariably be found to be approximately conformed to. An example may be quoted in the extensive ranges of sandhills on the north coast of Cornwall.

This theory finds confirmation in the fact that thirty years' observations at the Fernley Observatory, Hesketh Park, Southport, from 1872 to 1901, show the winds between the points south-east and south-west to have been 47 per cent. of the whole. But as the south-east winds are almost invariably too slight in force to move sand at all, they may be left out of consideration. Mr. J. Baxendell, the Borough Meteorologist, is the authority for the statement that as the result of 28 years' observations the winds strong enough to produce sand-lifting come chiefly from the south-west and west. The direction in which nine-tenths of the trees, in unsheltered positions, in the country lying behind the Lancashire sandhill stretches, are inclined, is sufficient proof of the predominance of south to westerly winds. Blowing sand advances in a gale like a wave, to a height of as much as 12 feet.

The general lie of the sandhill ranges on this coast will be found to be W.N.W. to E.S.E., the steep side which fronts the prevailing winds being mostly W.S.W., and the opposite side, as may be well seen from the Liverpool-Southport railway, having usually a long slope towards E.N.E.

The countries where coastal sand-dunes are found on the largest scale are along the south-eastern and eastern shores of the Mediterranean, chiefly from the region of the Nile delta to Beirut. One sandhill between Gaza and Joppa is said to be seven miles in length and four in width, and has reached a height of over 200 feet. Throughout Palestine blowing sand has made most destructive ravages. In New South Wales sandhills are also found on a large scale, reaching 200 feet in height and as far as ten miles inland. On the Dutch coast they are found usually much higher than in Lancashire, but with a comparatively narrow base.

The laws which govern the formation of (1) sandhill ranges, (2) wind ripple marks on the surface of dry desert sand, (3) wave ripple marks on beaches, (4) and wind-raised waves of water, have been made the subject of extended and interesting investigation by Mr. Vaughan Cornish, F.G.S., and he has found that the same ratio of length to height obtains almost exactly in each case, namely, from 17·1 to 18·4, or, approximately, 6 to 1. Sandhills are of larger dimensions because they do not subside during the intervals of calm.

CHAPTER XIV.

Star-grass and Sandhills.

No one can enter far in the study of sandhill formation without becoming alive to the important part which various grasses have played in the process. It is hardly too much to say, in fact, that without star-grass, which is found in greater abundance on this coast than in any part of the British Isles, although we should have had the same amount of blown sand, we should have had few, if any, sandhills.

The particular way in which star-grass promotes dune formation is not only by the binding together of the sand by root ramifications, but by the interception of sand as it is blown up the windward slope and against the summits. The sand impinging on the bowing blades, nearly two feet long, immediately drops in the lee of the blades, which continually push their way up through the accumulating drift. But there is a limit to this upward growth, and on this coast this is usually found to be about 60 feet, but here and there between Formby and Ainsdale the hills reach over 80 feet.

The reason for this limit is that a certain amount of moisture is essential to grass growth, and its suction powers fail to draw up this moisture when a height of about 60 feet has been attained. Further supplies of sand go to add to the width and to fill up the valleys between the hills. Mr. H. T. Crofton, who has made some extended observations on the St. Annes sandhills, has found that the rate of growth exceeds, under favourable conditions, two feet per annum.

Star-grass spreads rapidly by means of its knotted horizontal roots. Seeding plays a very minor part in the spreading process.

The chief growing time for sandhills is in the dry and frequently windy months of March, April, and May. As the star-grass is then growing, the three chief conditions—wind, dryness, and grass-growth—happen to coincide; but growth proceeds to some extent all the year round.

The ravages of blowing sand having been the cause of such enormous losses to the landowners and their tenant farmers, we can well understand that the minimising of the evil was at an early date a subject of serious consideration. Generally speaking, nothing has been found to answer so well as the planting of star-grass in order to promote the raising of a protective barrier of hills. As long ago as Queen Elizabeth's reign, the extirpation of star-grass was prohibited, and in 1742 an Act of Parliament was passed applying specially to the Lancashire and Cumberland coasts, making the uprooting of star-grass a criminal offence.

As early as 1711 leases at Formby were granted only on condition that the leaseholder assented to a clause in which the planting of a stated quantity of star-grass every year was made obligatory. This obligation was complied with down to 1886 by the leaseholders under the Crosby Blundells, but since the present owner has ceased to enforce this condition, much land has been laid waste between the River Alt and Waterloo.

The balance of evidence seems to be in favour of the belief that star-grass is indigenous to the Lancashire coast, and that it has not been transplanted here. The point cannot, however, be considered a settled one.

Roots are now frequently exported from this coast to remote parts of the world where it is desired to promote sand-dune growth.

What is commonly known on this coast as star-grass is variously named elsewhere "marram-grass," "sea-mat grass," "sea-reed," and in Scotland "starre" or "bent." Its botanical name, as accepted at Kew, is "Arundo arenaria" (Linn.), but other authorities call it "Psamma arundinacea" (L.) and "Ammophila arundinacea" (Baxter), also "Psamma arenaria."

Another species, Psamma Baltica, is found all along the east coast of England and on parts of the

Scotch coast. This has a stronger, thicker blade than star-grass, and is rather more blue than green in colour. Patches of this variety are to be found between Waterloo and Hall Road, on the coast side of the railway.

"Salix repens," var. Argentea, or silver willow, is another sand-binder which is found at frequent intervals between Birkdale and Formby.

"Triticum repens," or creeping wheat-grass, is a smaller grass of blue-green colour, which grows in colonies at intervals at the foot of the hills, just above high-water mark. Unlike star-grass, it requires moist, sandy, but not muddy ground, and is usually found nearest of all grasses to the sea.

The sand sedge, "Carex arenaria," is another lowly plant whose subterranean stems, extending in all directions, help to bind the loose sand, and whose matted leaves act as a barrier to sand-drift.

Maritime pines have proved very effective in stopping sand-drift on the Norfolk coast, also on the coast of Norway, Jutland, and elsewhere.

In Cornwall wild thyme has been found more effective than marram-grass.

At South Shore, Blackpool, where the star-grass has been largely destroyed, the hills have been spread about in a Sahara-like desert.

At Abermenai successful experiments have been made to extend star-grass by seeding.

Before star-grass obtained a hold on this coast, north of the Alt river, there was nothing to prevent the sand drifting inland. We find such drifts beyond Blowick, on the inland side of the Isle of Wight farm at Birkdale, and at "Blowing Sands," a hamlet half-a-mile inland from South Shore, Blackpool.

Thanks to star-grass, the loss in the covering of cultivated land has now become an evil of the past, and a loss of the land at the expense of the sea has been turned upon two sections of the Lancashire coast into a gain of the land upon the sea.

The landward limit reached by drifting sand will often be found to be a ditch or some small stream of running water. There is a good example of this to be seen between the Southport Infirmary, in Scarisbrick New Road, and Kew—now Zoological—Gardens. On the seaward side of a narrow ditch the land is about four feet higher than on the landward side. This excess represents the accumulations of blown sand, the running water having prevented the sand reaching the opposite side of the ditch, where the old level of the moss is maintained. In some cases the inequality of surface where the sand and moss meet is due to peat-cutting before railway facilities caused coal to supersede it as a fuel.

CHAPTER XV.

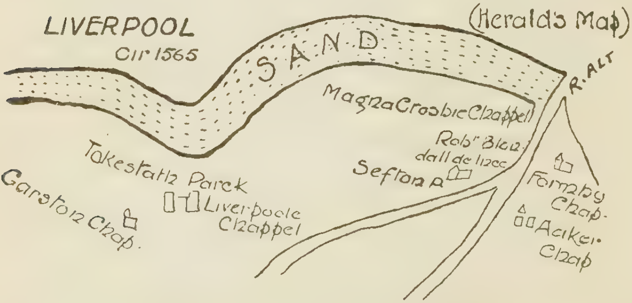
WHEN AND WHY DID THE SOUTH LANCASHIRE SANDHILLS BEGIN TO FORM?

We now approach the crux of the problem which it has been the main purpose of this inquiry to elucidate.

If the advance of the sea upon the coasts of North Wales, Cheshire, and the long Lancashire seaboard has been for a long period continuous, excepting only in the sand-dune sections north and south of the Ribble, when and why did the changes set in which led to sandhill formation and the pushing back of the sea on these sections?

To anyone surveying this vast desert of miniature Alps—say between Ainsdale and Formby—it will probably be learnt with some degree of surprise that all this accumulation of sand, stretching in two directions as far as the eye can reach, has been, for the most part, the work of but three to four hundred years at the most. In a paper read before the British Association in 1903, Mr. J. Lomas, Lecturer on Geology in Liverpool University, expressed the opinion that 400 years ago there were no sandhills on this coast.

All the old maps available tend to confirm this belief. The "Herald's Map," of 1565, and de Gomme's of 1644 date, show a belt of sandhills all along the Mersey estuary from Garston to the mouth of the Alt; but almost every map prior to 1700 has the word "moss" marked on the strip of coast from near Formby Point to about Churchtown. Jansson's Map of Lancashire of 1646 is an example. In Bowen's map of 1751 the moss has shortened at south to about Ainsdale, whilst still extending to where Southport now stands. From this and other evidence it is a warrantable inference that the sandhills, and the star-grass which has made them possible, have extended from the south northwards; that the



GARSTON TO FORMBY ABOUT 1565.

(The word "Sand" does not appear on the original—a "Herald's" Map.

River Alt delayed this extension, as blowing sand cannot cross a stream; that they commenced to form at Formby at the end of the 17th century, the immediate cause being the joining up to the mainland of a large bank off Formby Point by the sanding up of the deep channel near which the ancient port of Formby stood, thereby increasing the sand-drying area between high and low water; and that they extended rapidly northwards after this date. Successive ranges forming, all on the seaward side, the high-water mark which had previously been advancing on the land was driven back, and this process still continues.

The south to north extension hypothesis is not inconsistent with the supposition that there may have been patches of hills here and there before a continuous range was formed.

The rate of lateral growth of hill ranges, under the conditions obtaining on this coast, is surprisingly rapid. A convenient standard of measurement is available in the ranges which have sprung up between the Southport-Birkdale boundary and the Palace Hotel in the twenty-four years which have elapsed since the construction of the Birkdale Esplanade in 1885. This period has sufficed for the accumulation of ranges 20 to 27 feet in height and of a maximum width of 190 yards. This width represents a lateral growth of eight yards per year, or 800 yards a century. Under favourable conditions such as these it is clear, therefore, that 200 years would suffice for the setting up of ranges a mile in width. As the Lancashire sandhills nowhere exceed one mile and a-half in width, it is clear that three centuries, or four at the outside, are all we need to account for the extent to which we have them to-day.

The reader will bear in mind the many considerations advanced in the Southport to Formby chapters in proof of the contention that moss land or tidal waters covered perhaps the whole of the present sandhill area probably three or four hundred years ago. One only need here be referred to. The 1736 Bold Estate map of North Meols referred to in Chapter VII. shows that the sandhills had then advanced, where Southport now stands, from Hawesside Street and Yellow House Lane, their starting-point, as far in a seaward direction as about the site of the present Market Hall. This point is about midway between the then landward edge of the sandhill range and the point to which, a hundred years later, the sandhills had advanced, that was to the line of hills used as a foundation for the present Promenade, the first section of which, from Nevill Street to Coronation Walk, was made in 1834-6. If the sandhills between Yellow House Lane, the landward edge, and the Market had formed at the same speed as those between the Market and the Promenade, we need not go further back than 1636 for the date of their commencement.

The evidence in the trial of 1503, and the overwhelming of the Argarmeols coast, tend to prove that the site now covered by sandhills had been, at a date not long before, washed by the sea.

But to account for the entire deposit of sand, as distinct from the sandhill ranges, we must go further back fully two thousand years. Mr. Mellard Reade has made an interesting observation and calculation on this point. He found that it took eight years for the wind to move three cubic yards of sand. Taking twelve feet as the average thickness over the whole 22 square miles, he arrived at 2580 years as the age of the whole deposit.

The reader must be careful to distinguish between sand beds, which were accumulating for centuries before the conditions became favourable to hill formation, and sand in dune form.

The etymology of the name " Meols " will occur to some as inconsistent with this view. Meols, the ancient name of Churchtown, now a part of the borough of Southport, is mentioned, as Meler, as having been the place where the body of St. Cuthbert rested (867-874) on its way from Lytham to Halsall. It is doubtless connected with the Icelandic word " melar," meaning sand heaps, which is still applied to the volcanic ash dunes of Iceland. Professor Rhys believes it to be derived from a Celtic word meaning " bald " or " bald-topped." In Ireland a " meyll " man is a bald-headed man. In Manx a hornless cow is called a " meyl " cow. In Wales they are called " mooley " cows, and bald-topped hills frequently bear the prefix " Moel "; Siabod Hebog, Llys, are examples.

The objection can be met. There are weighty reasons for the belief that the Ribble's course to the sea was, a thousand years ago, further south than it is to-day. The main stream down to the 17th or 18th centuries flowed through what is now called the Southport or Bog-hole Channel. If its course was no further south-east than this, the sand brought down by it would accumulate on the Churchtown coast. This Ribble-borne sand would give rise to the sand-dunes, upon one of which St. Cuthbert's Church is said to have been originally built. These hills would tend to disappear by the general raising of the intervening spaces (see Chapter VI.) when the Mersey-borne sand began to accumulate on the Southport coast. As the main channel of the Ribble moved northward, the sand brought down by it would become piled on the north shore, between Fairhaven and South Shore, through the action of the prevailing winds. This is the probable explanation of the recent origin of the St. Annes sandhills. At the present time little, if any, Ribble sand comes on to the Southport coast. It contributes, however, the clay deposits of the Crossens shore. These, down to about 1870, were also laid on the Southport shore, but are now deep under Mersey sand.

There is ground for the belief that before star-grass became common patches of small hills arose and disappeared at intervals on this coast. Such hills may account for the name " Argarmeols."

Ancient Meols, in Cheshire, would derive its name similarly, but from sand brought down by the Dee.

The modern range of sand-dunes from Blundellsands to Churchtown originated in the main from an altogether different source. They owe their rise, assuming the writer's conclusions to be correct, for the most part, to the consequences of a comparatively late change in the course taken by the River Mersey to the sea. It is impossible to fix the date of this change, but reasons will be adduced in the next chapter for fixing the limits at not less than 1000 nor more than 1700 years ago.

CHAPTER XVI.

THE MERSEY AND ITS CHANGES.

A large amount of speculative interest attaches to the past history of the Mersey. Agreement even as to its main outlines has not yet been reached. There is little doubt, however, that in pre-glacial times the river took its course to the Irish Sea approximately along the same line which it traverses to-day. Prior to the making of the Mersey Tunnel, Mr. Mellard Reade, F.G.S., confidently predicted that its pre-glacial bed would be found slightly on the north side of its present course. The forecast was verified in the result, though it has been pointed out as a fact incompatible with this theory that the solid rock underlying the drift beds lies deeper near Runcorn than it does below the river near Liverpool.

It is not, however, disputed that in glacial times, and when the mainland reached far out into the Irish Sea, the drainage of the Lancashire and Cheshire meres, both in and outside the present coast-line, flowed in an easterly or south-easterly direction, probably to join the Trent or Severn drainage areas.

Strong evidences of the truth of this theory have been found in river gorges filled with stones and drift of undoubted northern origin, at Ironbridge, in Shropshire; at Rudyard, in Staffordshire; and elsewhere.

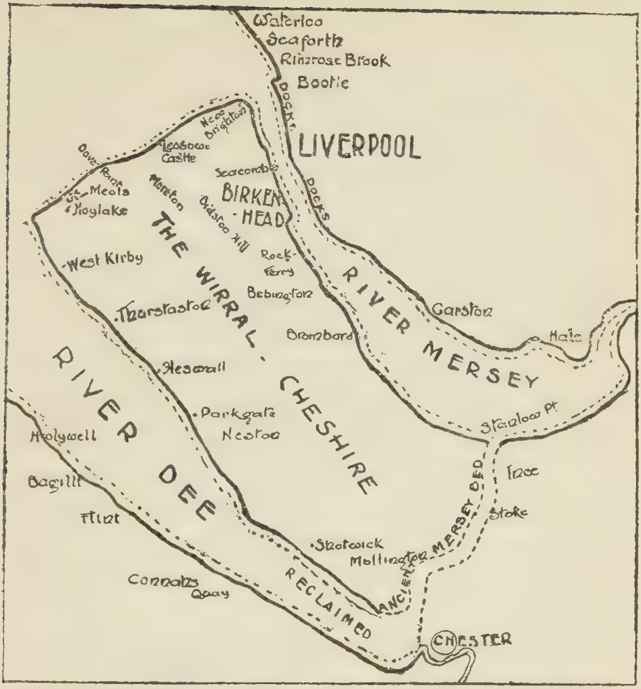
Another presumptive piece of evidence is the fact that many of its tributaries flow into the Mersey on both the Lancashire and Cheshire sides, after flowing in a direction contrary to that of the Mersey itself. The Wallasey Pool, Bromborough Pool, and Ditton Brook may be mentioned as examples. Few exceptions are found anywhere to the rule that tributary streams flow in a direction differing only by a slight angle from that of the main river which they join.

More than eighty years ago Dr. Ormerod, in his "History of Cheshire," advanced the theory—it may have been advanced previously, but the writer is not aware of any evidence of this—that, before the Mersey resumed its present course to the sea, and long subsequent to its flowing in a southerly direction, it flowed across the eastern end of the Wirral peninsula and formed a junction with the Dee just below Chester, which city stood on a point of land between the two rivers. This ancient channel is believed to have been along the same flat, winding valley, along the bottom of which the Dee and Mersey, or Ellesmere, Canal was constructed in the year 1806. So well adapted was its low-lying level found to be that not a single lock was required along the entire canal. The valley runs irregularly from the present Mersey estuary to the Dee by Stoke, Croughton, Chorlton, Backford, and the two Mollingtons, its course separating Wirral from the hundred of Broxton.

At Chorlton, Coghall, and other points in this valley the soil has been examined, and about a yard below the surface has been found to consist of the same grey sea sand as has been found in the reclaimed portions of the Dee. In the gravel sides of the valley quantities of sea shells have also been found.

In the earliest known maps—those of Ptolemy—the Dee bears the name of Seteia, a name believed to be derived from "C," "Sa," a stream, and "deidhe," a couple. The Welsh name of the river is "dwy" or "dwfr," meaning "two waters." These derivations lead to the inference that the change has taken place in historic times. The fact that Ptolemy's map altogether omits either the Mersey or the Ribble estuary (one or the other) will be specially dealt with in a later chapter as an argument strongly corroborative of the theory here put forward.

The derivation also of the name Mersey—from "Meirse," Celtic for marsh—would seem to point to its having been so named at the time when it began to find its way to the sea through the marshland outside the present estuary. The earliest mention of the name is in a Saxon document of about 1006 date. No Roman historian



The Wirral Peninsula, Cheshire, Showing Ancient Course of River Mersey.

refers to it. Liverpool is comparatively modern. The Domesday Survey does not mention it.

It is not difficult to find entirely adequate reasons for the change in the Mersey's course to the sea. The two main reasons would be—

1. A general subsidence of the Birkenhead end of the present estuary, probably extending some distance south and east; and
2. Sea encroachment on the coast.

The fresh-water mollusc remains which have been found around the upper reaches of the estuary have compelled the adoption of the theory that an inland lake once existed here, through which the Mersey would probably take its course to the Dee. As subsidence proceeded this lake would gradually extend in a westerly direction.

A stream would already exist as far down as the junction of Wallasey Pool with the Mersey. The Birket river, which probably once drained one or more fresh-water lakes in the neighbourhood of Moreton, would flow through the Wallasey Pool as now, but south-eastwardly into the fresh-water lake at the head of the Mersey estuary.

Once a new and more direct channel to the sea was formed, the old Broxton channel would become sluggish and soon silt up.

That a considerable subsidence has taken place there are many proofs.

The Mersey at Runcorn Gap was once easily fordable at low water. It could be forded in Roman days at Warrington. Near Eastham, during the making of the Ship Canal, a paved road 18 feet below the surface was cut across by the canal. About the same time several canoes were found 10 to 15 feet below water-level in the bed of the new canal.

During the making of the Birkenhead and Chester Railway in 1850 the Rev. C. Massey records the discovery at Bridge End, Wallasey Pool, of an old bridge of massive and durable construction, and which is believed to be Roman.

The level of the roadway of this bridge, which was covered with river silt, was 14 to 15 feet below the level of high tides. The stream had flowed from the south into the Pool. Mr. Massie, in a paper which he contributed to the first number of the Chester Archæological Society, quoted Sir James Picton as having "come to the conclusion that a gradual subsidence had been going on about these parts (the discovered bridge) from hidden causes in the bowels of the earth, making its crust to shrink and settle down at the average rate of about a foot in every century."

The fact that the observations made by the Rev. J. Pearson on the mean half-tide level at Liverpool, above the old Dock-sill, showed a steady rise amounting to $7^1/_7$ inches in the 20 years ending 1873 is a conclusive proof that a subsidence equivalent to about 3 feet in a century along the Mersey basin, and probably along the Cheshire sea-board as well, is in progress.

These observations were epitomised in a paper read by Mr. Richard Veevers before the Lancashire and Cheshire Historic Society, and which appears in the 1897 report. The following table is based on tidal records taken by the self-registering tide gauge at the George's Pierhead, Liverpool:—

	FT.
1854-59	4·948
1859-64	5·073
1864-69	5·208
1869-73	5·265

A simple calculation shows that the Mersey bed would lie higher by over 50 feet in Roman days, assuming that the movement has been continuous since that period. But there are reasons for believing that in the early part of the sixth century an extraordinary subsidence affecting the Cornwall, Cardigan Bay, Carnarvonshire, Denbighshire, and Flintshire coasts took place, which permanently submerged hundreds of square miles of land. It is probable that a subsidence which affected a coast so near as that of Flintshire also lowered the levels of the present Mersey estuary. The date of this sixth-century subsidence, which will be further dealt with in the chapter on "The Great Inundation," is one which accords with such other data as are available for giving a clue to the period when the Mersey broke through what remained of the marshland which previously separated it from the sea.

It is generally taken for granted that we have no evidence north of the Mersey of any change of level having taken place within historic times. But it would seem not improbable that some of the higher-lying forest remains which have been discovered between Seaforth and the Alt belong to a much more recent date than the Neolithic or even earlier period to which they have by some writers been assigned. About 1906 a high tide exposed the remains, about two miles south of the Alt river, of a large number of tree stumps by the washing away of the sandhills which overlay them. Some of the wood seemed quite fresh in appearance. The level where the trees had grown was about the same as that of the high-water level.

Mr. John Formby believes that the Formby coast has been rising about 18 inches a century in recent times. The latest finding of competent geologists is that an east and west line crossing from Dublin to Liverpool shows rising land on the north, and falling levels to the south of this line.

There would appear to be also historical evidence worthy of consideration in support of the changed Mersey outlet theory. The Rev. W. T. Bulpit has made out a strong case in support of the theory that a road was used by the Romans from a point in the neighbourhood of Seaforth, through Harkirke (Ince Blundell), Formby, Birkdale Common, and Far Banks, at each of which places Roman or Saxon coins have been found.

In 79 A.D. it is a matter of history that a Roman army, under Agricola, marched from Anglesey along this coast and over the ferry by Hesketh Bank to the Roman station, Ptolemy's "Portus Setantii," which there is reason to believe stood on a point of land to the east of Lytham. But all trace of this road was lost between Crosby and Seaforth.

Mr. Bulpit's theory accords with the supposition that at this time there was no Mersey estuary separating Seaforth from Cheshire. There are good reasons for the belief that as late as 400 years ago the New Brighton extremity of the Wirral extended to a point opposite Blundellsands. (See Speed's 1610 map.)

In a paper read by the late Mr. E. W. Cox before the Lancashire and Cheshire Historic Society, he mentions the fact that four of the oldest roads and tracks lead directly to the sea at the north end of the Wirral, as also do some at Crosby and Formby.

Confirmation of the contention that these roads once probably formed ways across the bed of the present Mersey is on record in an observation made by the Rev. W. Rawson, of Seaforth. " While the shore at Seaforth was being washed away " (about 1850?), he wrote in a Lancashire and Cheshire Historic Society paper, " the extremity of a paved roadway was undermined. As the stones adhered together, it projected out like a plank, and remained so for some weeks."

The theory does not exclude the belief that marshy streams would doubtless have to be crossed in the passage across the present Mersey bed.

Mortimer, who wrote at length on the past of the Mersey, was of the opinion that some violent inundation of the sea, probably in the fifth century, was the immediate disturbing factor which resulted in the adoption of the present outlet past Birkenhead. Tradition, he contended, also supported this theory.

Mr. Joseph Boult (Proc. L'pl. Lit. & Phil. Soc., Vol. xxvii.) assigns a date as recent as 1279 for the breaking through of the sea into the fresh-water lake at the upper end of the present estuary. It is on record that Stanlaw Abbey, near Ince, on the Cheshire side of the estuary, was completely overwhelmed by some tidal inundation in this year, causing the monks to decide on removal to Whalley. A second inundation is mentioned by some writers.

In the discussion which followed on a paper read by Mr. J. N. Shoolbred before the Inst. of C.E. in 1875, Admiral Evans said: "In the Roman period there was an inland mere or sea, having no direct outlet through the present channels. The great area of sandbanks now extending from Southport to the Dee was then a huge, absorbent swamp."

The rapid erosion of the sandhill coasts east and west of the mouth of the Dee is in complete harmony with the theory that the change in the course of the Mersey to the sea is the main cause of the late formation of the South Lancashire sandhills. All this Mersey-borne sand would, prior to this change, find its way through the Dee on to the Prestatyn, Rhyl, Hoylake, and Leasowe shores. The ranges there would be, some centuries ago, on a very much more extensive scale than those on the Lancashire coast to-day. But since the change in the course of the Mersey, the greatest of sand-carrying rivers, sea-wear has been greater than any accumulation resulting from the comparatively small amount of sand as is borne by the Dee, which drains, for the most part, an area of Cambrian and Silurian formations yielding little or no sand.

It is not only upon the Blundellsands to Southport coast that this Mersey-borne sand is now deposited. The steadily rising shore between St. Annes and Blackpool is due probably not less to tidal drifted sand from the Mersey than from the nearer Ribble.

Between 1823 and 1903 a width of nearly 200 yards of sandhills disappeared at the Leasowe end of the sandhill range. Eastward of this point the sea is at the present time rapidly eroding the hills as far as Harrison Drive, Wallasey.

Another fact which supports the same theory is the wasting away of the great Hoyle Bank, which Collins' Map of 1687 shows to have stretched across the mouth of the Dee, 13 miles in length and 3¼ miles in width. More than half of the western end has now completely disappeared, and a channel now divides the bank into two parts.

The indirect connection here pointed out between sea-wear combined with a general subsidence west of the Mersey and accretion immediately to the north would appear to have been entirely overlooked by previous writers upon this subject. The writer is not aware of any theory previously advanced which accounts so satisfactorily for two opposite sets of tendencies upon coasts so near to each other. Its adoption has been led up to by the necessity of finding a sufficient cause for the quite recent origin of the South Lancashire sandhills. If the Mersey flowed along its present course in prehistoric times, it is reasonable to contend that the Formby range of sandhills would have started at a correspondingly earlier date. A comprehensive view of the whole of the facts would seem to warrant the conclusion that Ptolemy's omission of an estuary in his map was no error at all.

CHAPTER XVII.

The Cheshire Coast.

Of all the North-western counties, Cheshire has been the heaviest loser by coast erosion. The estimate as to the extent of this loss, as given in evidence before the Coast Erosion Commission in 1907, was 104 acres of land and 1120 acres of foreshore, with a compensatory gain of 59 acres only during the 28 years ending 1898.

As to the seaward point to which the coast extended 400 years ago estimates vary as much as from 1½ to 4 miles seaward of the present coast-line. No authentic records of the coast-line are available prior to 1690, when it is said that the Dove Point projected one-and-three-quarter miles from the shore, so that the Rev. A. Hume may have been warranted in the belief that even in historic times several miles may have been washed away.

Exact observations were made on the "Erosion of the Sea Coast of Wirral" by G. H. Morton, F.G.S., and the results were given by him in a paper read before the 1896 meeting of the British Association. He found the greatest erosion to be taking place at Dove Point. Two wooden "perches," having a stone base, formed fixed points of measurement and showed that the erosion of the coast between 1863 and 1894 had averaged from four to five yards per annum, or 144 yards in all.

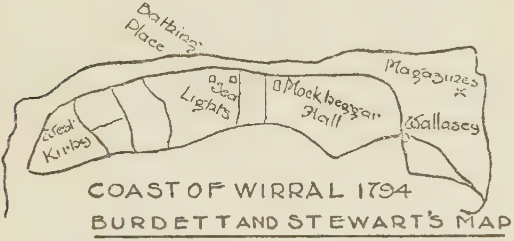
South-west of Dove Point the waste becomes less. At Hoylake he found no erosion, the Red Stones at Hilbre Point protecting the land from the sea.

Leasowe Castle originally stood in the middle of a plain, which was once used as a racecourse. It now stands close to high-water mark, from which fifty years ago it stood half-a-mile distant. An incident recorded in history testifies to a racecourse having stood here towards the close of the 17th century. The aristocratic Wallasey races, the glory of which passed in 1758 (or earlier) to the Roodee course at Chester, were held here. When the Duke of Monmouth, who led the rebellion against James II., visited Chester he found that the principal people had gone to the races on the coast; so he followed them there. The course is now for the most part under the sea.

The remnant of the plain is now protected by Leasowe embankment, which was built by the

Liverpool Corporation in 1829 to prevent the breaking of the sea into the valley of the Birket. This embankment extends for nearly two miles in a south-westerly direction from Leasowe Castle.

The first two lighthouses built in England were established at Leasowe in 1763. The old outer Leasowe lighthouse, now hardly visible at low water, when first built stood some hundreds of yards above high-water mark. The light of the inner lighthouse was finally extinguished in July, 1908, when floating luminous buoys took its place.



COAST OF WIRRAL 1794
BURDETT AND STEWART'S MAP

Nearly opposite Leasowe Castle, some 200 yards below high-water mark, Dr. Nimmo discovered a number of human skeletons regularly laid in rows. This was doubtless the site of an ancient cemetery, and was within the shore-line of 1771 date.

In the 70 years down to about 1830 fully 200 yards had been worn away. Latterly the rate of erosion has been much greater.

The advance of the sea upon a house known as "The Warren," standing half-a-mile south-west of Leasowe Embankment, was sworn in an affidavit in a law case, by the man who had lived in it since his birth, to have been as much as 290 yards down to 1892, when high-water mark had approached to 60 yards distance only. The lost land included sandhills up to 60 feet in height. In Burdett's map of 1794 a shore road is shown along the heath which then lay on the seaward side of Leasowe Castle.

Erosion is also proceeding on the Cheshire side of the Mersey estuary, especially at Bromborough Pool and above Price's Candle Works. For forty years the loss has averaged about one foot per annum.

Birkenhead takes its name from Birchen Wood, a once extensive forest of birch trees.

In all probability the principal sandbanks outside the Mersey estuary were in Roman days, if not later, inhabited portions of the mainland of that day. It is on record that in 1828 a number of large square stepping-stones were disclosed during an exceptionally low tide, which were doubtless once used as aids to crossing the Rock Channel from Wallasey shore to Burbo Island. At that time, Mr. Hume says (Lanc. and Chesh. Hist. Soc., 1865-6), the tradition survived that there had been a church and a fresh-water well surrounded by masonry on Burbo Bank.

It was not until 1838 that the present Victoria Channel, now almost exclusively used as an entrance to the Mersey, was formed. In 1687 vessels partly unloaded near Hoylake until light enough to sail over the flats to Liverpool, then a port of but small importance.

In the earliest-known reliable map, one of 1650 date, by Visscher, the only place marked in Wirral is Meols. It would appear to have been a Roman settlement of some considerable importance. Its site now lies under the sea. It stood on a high sandy extension of the mainland, of which the Dove spit is all that now remains. At least 7000 antiquities—coins and other articles of British, Roman, Danish, Saxon, and English date, mostly belonging to the 13th and 14th centuries—have been found in this neighbourhood.

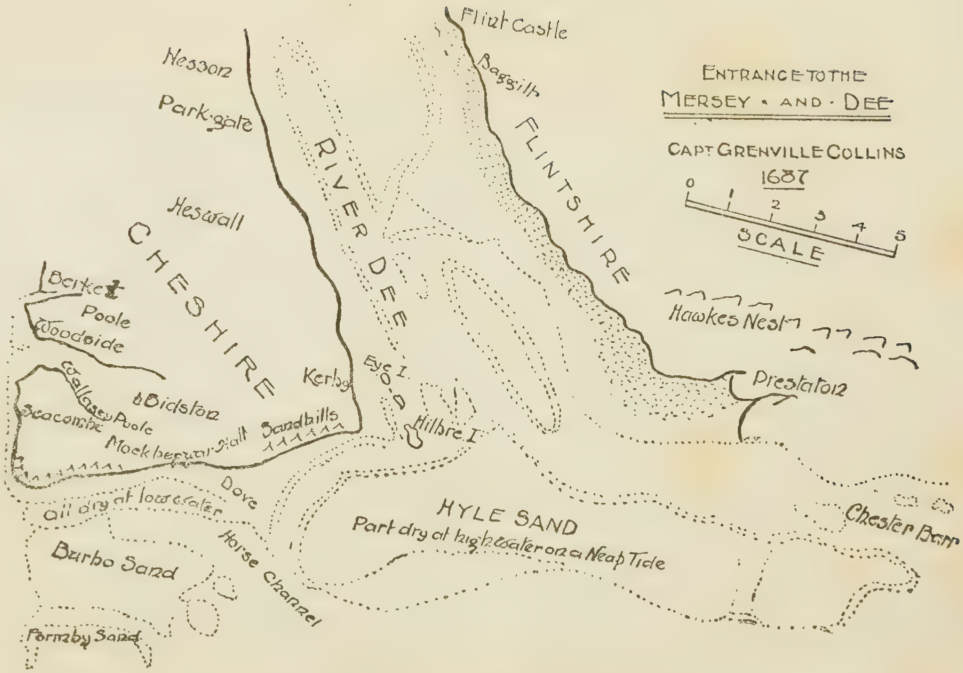
The last houses of Ancient Meols were abandoned in Tudor times. One account states that it was in Edward the Third's time that Meols shore was submerged in a lagoon. Domesday Book refers to the town as " Melas."

The promontory upon which Meols stood curved round Hoyle Lake towards Hilbre Island. Hilbre is shown in a map of 1575 date by Lhuyd to have then been part of the mainland.

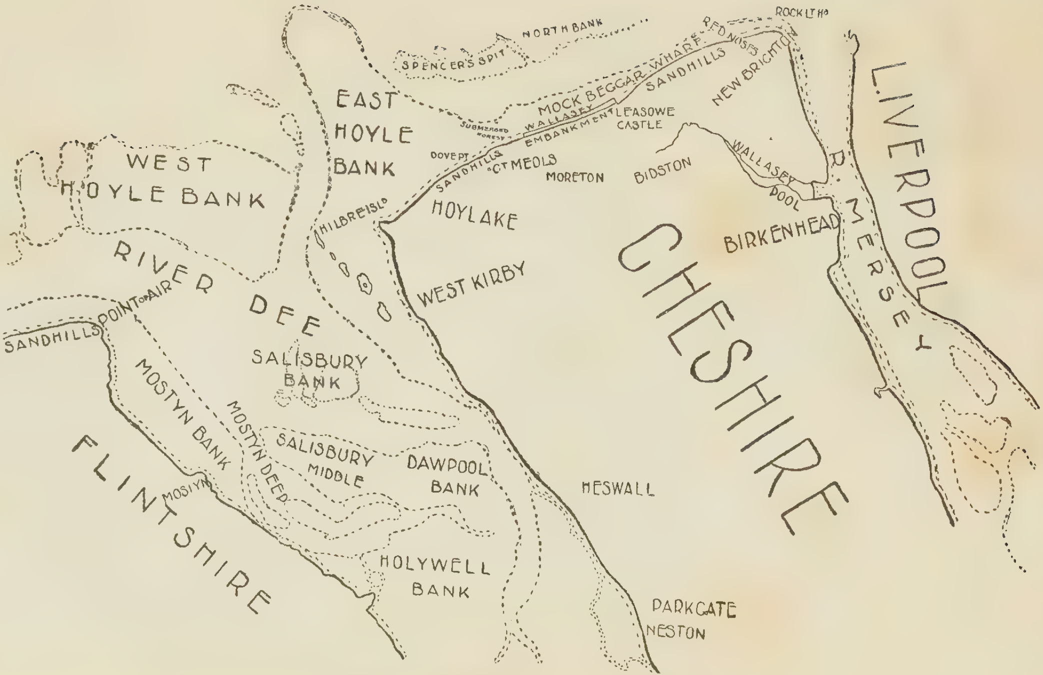
Later it became an island, but eight times its present size. Its name is derived from St. Hildeburgh, who was chief of a cell of monks here.

In Elizabeth's reign it is on record that " 4000 foote and 200 horse " were quartered at Hilbre, whence they set sail to quell the Tyrone rebellion in Ireland: a proof of its size being then very much larger than it is to-day.

Hoyle Sand, or Bank, opposite the Dee estuary, two hundred years ago was undivided, and at an



Collins' Map of Dee Estuary in 1687,
Showing Hoyle Bank and Former Course of Dee to Sea.



Map of Cheshire—Present Day.

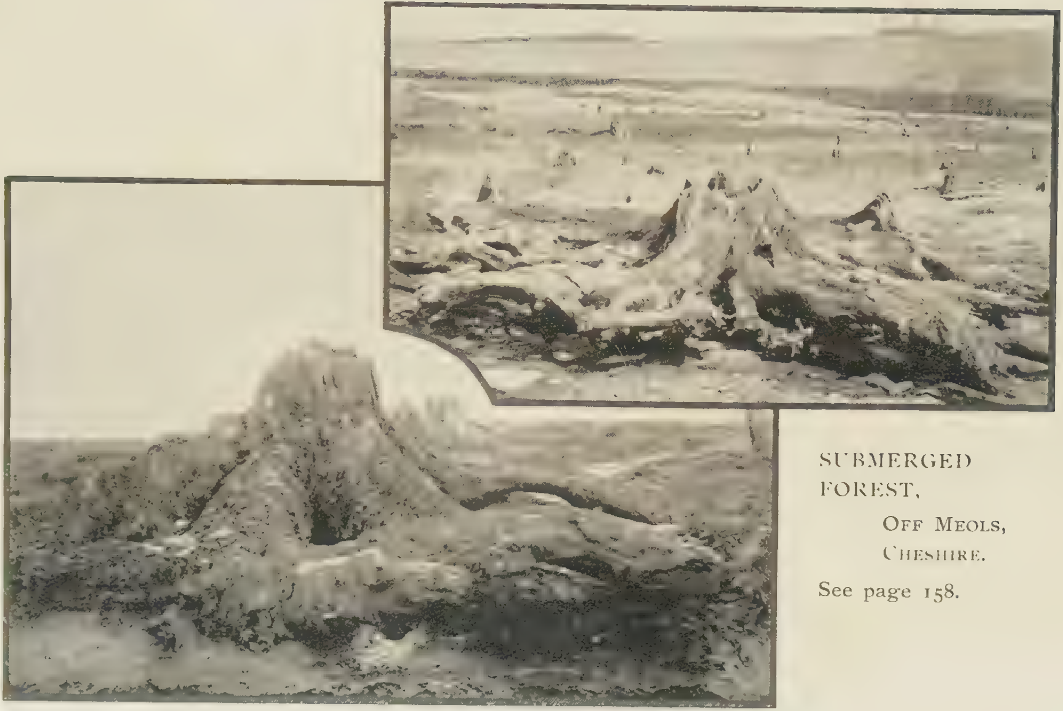
earlier period was a fertile tract of land, being shown as such in a map formerly to be seen in Mostyn Hall, Flintshire. The inference is warranted that it has been since the Roman occupation a part of the Cheshire mainland.

At Hoylake sea-wear is proceeding rapidly. At a part a little to the north of it as much as 60 feet was worn away in a single storm in 1863. Where no protective wall exists the loss is also considerable at West Kirby, Neston, and Parkgate.

Remains of the submerged forest are still to be well seen at low tide at and near Dove Point and opposite Meols, though gradually becoming less visible. When last seen by the writer (April, 1909) over 200 stumps bedded in blue clay were still visible opposite Meols, but at the present rate of erosion the bed will have become worn back to the embankment in the course of a few years, and the remains all washed away. An article which appeared in the "Gentleman's Magazine" in 1796 shows that these forest remains have for long been the objects of speculative interest.

The forest or arboreal beds belong to two periods, the lower one being prehistoric and the upper bed having formed the surface probably as late as Roman and Saxon times.

Mr. Ecroyd Smith has constructed the following instructive table showing the order of the various deposits on the Dove-spit shore, and the remains and antiquities recovered from them. Fresh remains continue to be disclosed as sea-wear proceeds.



SUBMERGED FOREST,
Off Meols,
Cheshire.

See page 158.

Deposits	Antiquities Found
1.—Loose blown sand ...	
2.—Marshy deposits ...	
3.—Firm drift sand... ...	Mediæval objects and bones of domestic animals.
4.—Arable soil...	ditto. ditto.
5.—Blue marl or silt ...	Saxon and Norman coins, etc.
6.—Arboreal deposit with stumps, etc.	Saxon and Roman coins and flints.
7.—Blue Marl with vegetable fibre	Few primeval flints.
8.—Lower arboreal deposit with a few stumps ...	
9.—Boulder clay or marl	

In a paper read by Mr. T. Mellard Reade, F.G.S., before the British Association in 1896, he makes it clear that the formations on the Cheshire coast reveal three distinct land surfaces prior to the present surface. His sectional diagram is reproduced :—

	Blown sand.
3rd land surface	Peat and forest bed.
Post-glacial land surface	Scrobicularian clays and silts.
Pre-glacial land surface	Triassic, Bunter or Keuper Sandstone.

The later movements of the Cheshire coast are proved to have been of a downward character by the silt deposits above the upper part and forest bed. The causes of these changes lie deep down in the earth's interior, in forces acting over considerable areas.

Other evidences point to the probability that the coast from Leasowe to Hoylake has been gradually sinking for a considerable period. A great part of the plains of Moreton and Bidston are below the level of the highest tides, as much as 30,000 acres in Wirral being estimated as being below the level of spring tides.

There are many signs pointing to a fresh-water lake as having once existed here. Not only have many fresh-water shells been found, but the place-names between Meols, Bidston, and Moreton also point to the same conclusion. Some of these lakes probably belonged to historic times, and may have been due to the damming up of drainage streams.

In 1891 so much of the ancient level of the original land surface, now buried deep under drifted sand, was washed away by the spring tides as to expose a shelf of the original surface from 5 to 25 feet in width. On this exposed beach were found the remains of old houses. Portions of shoes with pointed toes, of the Edwardian type of the 13th and 14th centuries, were disclosed amongst other remains. Cart-wheel tracks and hoof-marks of horses and cattle could also be seen. A round hut had been uncovered a short time previously.

Boulders of large size may be seen near Leasowe Castle, and also up to 200 feet high on Storeton Hill—many of them bearing signs of having been glacier-borne from the Cumberland and Galloway high lands during the Glacial epoch.

The Dee estuary has seen very great changes.

A demand is made on the imagination when we are told that sea vessels once sailed up to Chester and landed their cargoes under its very walls.

Old Shotwick Church, at the eastern extremity of the Dee estuary and just below Chester, now stands lonely, but telling us of the lost town of Shotwick. Saxons and Danes sailed up the creek right under the walls of Shotwick Castle. From here Henry II. set sail for his conquest of Ireland. In 1637 Leland records that the Castle stood on the very shore. Once it was quite an important harbour. But it silted up, and a new quay was made at Neston about the middle of the 16th century, and to the end of the 18th century it was the chief point of departure for goods and passengers to Ireland, and was the largest and most important place in Wirral. It was also a great coaching terminal station. As passengers to Ireland were often weather-bound, the adjoining watering-place of Parkgate came into existence, and was for a time quite a fashionable resort. But the turn of Neston to become sanded up came about a hundred years ago, and what remained of its glory as a port passed to Liverpool, then a rapidly-rising port. Parkgate continued to be used as a port of departure for Irish boats as late as 1798. Where not protected, erosion is now going on about Neston and Parkgate.

As late as 1771, Pennant, in his "Tours in Wales" (Vol. I., p. 245), says that "297 coasting vessels entered inwards to Chester and 526 ships outwards. Of these, 23 came from the port of London." Also 95 entered from foreign parts and 216 outwards to foreign parts. Liverpool, in the patent, is styled "a creek of the port of Chester."

The broad sands of the Dee estuary once extended to Chester, but early in the 18th century extensive reclamation works were commenced, and the present straight and narrow channel between Chester and Shotwick was formed, a great part of the sands above Connah's Quay being also reclaimed.

The disastrous effect of these reclamations upon the navigation possibilities of the lower part of the estuary were accurately predicted by John Mackay, the margin of whose map, of 1732 date, contains his prediction that the navigation of Hoyle Lake and the lower Dee would be ruined in consequence. "Two hundred millions of tons of Tyde," he said, "will be prevented from flowing twice in every 24 hours, which on ye reflux acquireth the greater velocity to scour and keep open ye Lake and barr." Collins' map of 1687 shows "Hyle Sand" stretching for miles across the sea end of the Dee estuary, the main river flowing west between the bank and the Rhyl coast. This bank became cut in two, and Hyle Lake between the bank and the Cheshire shore silted up. The difference between the Dee estuary in 1687 and 1895 is shown in the accompanying sketch maps. Hoyle Lake has now virtually disappeared.

The present tendency is for the channel opposite Meols to fill up, and for the bank to join up to the mainland.

CHAPTER XVIII.

THE DEE TO THE CLWYD.

At the time of the Roman occupation the Dee estuary was fordable at more than one point. Edward I. is said to have built Flint Castle to protect the ford at this point, at one time much used. Agricola's army in 79 A.D. would probably cross here on its way from Anglesea to the station in the Ribble estuary.

In 1870-80 the Mostyn and Flint marshes were pastures intersected by tidal rills; now they have become a sea of mud, mostly devoid of vegetation. But the forces making for accretion on the Flintshire side of the estuary have added since 1869 343 acres to the whole county, after deducting 70 acres lost by erosion. (See Coast Erosion Commission Report, p. 90.)

The main channel of the Dee is constantly shifting its bed, and these movements often result in accretion. At Holywell and Mostyn large quantities of slag have been put down to stay erosion.

On rounding the corner of Mostyn point, the northern extremity of Flintshire, the angle of incidence of the prevailing winds, together with the large amount of sand brought down by the Dee and Mersey before the latter river assumed its present exit to the sea, resulted, probably at some date prior to a thousand years ago, in the formation of a very much wider range of sandhills than that which now extends from Mostyn to Rhyl. The probable explanation as to why a steady wastage of this sand-dune sea margin has taken the place of accumulation has been given in the "Mersey" section. The Mersey, and not the Dee, is the great sand-bearing river.

In Thomas's "History of the Diocese of St. Asaph" (p. 350) reference is made to an abatement in the rent due to Bishop Trevor for Gronnant-is-y-mor (between Mostyn and Prestatyn), owing to the sea having "eaten up his land in those parts." Trevor was bishop from 1395 to 1410. There is reason to believe that the loss was a considerable one.

Prestatyn Castle, built about 1020, must have stood originally about three miles from the sea, the distance between the ruins and shore being now just one mile only. Another proof of sea-wear exists in Sarn Badarn, a ruined old house midway between Prestatyn and Gronant, which is still to be seen, along with the remains of a sarn or causeway, at dead-low ebb of high spring tides.

The evidence given before the Coast Erosion Commission shows that sea-wear has proceeded with increasing rapidity in the five years ending 1907. Between 1871-98 about 100 yards disappeared at one point. It was also stated in evidence that 2200 yards on the Prestatyn coast are subject to erosion at the rate of about a yard per annum. This is attributed to submarine tidal currents causing lateral drift.

The following evidence submitted before the same court of inquiry by the St. Asaph R.D.C. shows that the situation is somewhat alarming :—
" Erosion has been very rapid of recent years;
" the whole range of sandbanks in these parishes
" (Rhuddlan, Dyserth, and Meliden), which is the
" only protection from the sea, is gradually dis-
" appearing, and unless some protective works of
" a substantial character are carried out soon, it
" will be a most serious matter for the parishes
" on the sea-board."

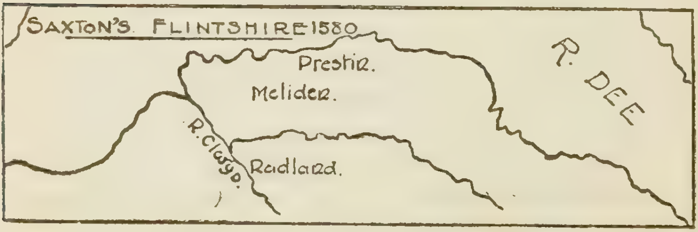
Between Rhyl and Prestatyn the wastage has been estimated at no less than 250 acres since 1794. Another authoritative estimate puts the loss at 500 yards on the coast between the Dee and Abergele during the last 150 years.

The sandhill range has been worn to so narrow a width in places, especially near Rhyl, that the prospect for that town, and for the owners of land at the rear of the sandhill range, is somewhat serious. The town of Rhyl being built on its landward side on land as much as three feet below the high-water mark of a 16 feet tide, or as much as eight feet lower than that of an abnormally high tide, the danger of a serious flooding of this portion will be imminent in the event of the sea breaking through the narrow range of sandhills at the east end of the town; and this is only a question of time. More than half of the town is built upon land lying below high-water level.

In view of this threatened irruption the L. & N.-W. Railway Company in 1906 raised its line two to four feet between Prestatyn and Abergele, building also a protective embankment parallel with the line.

Though the erosion at the east end has proceeded to the extent of 100 yards in the last 30 years, there is a tendency to accretion opposite the centre of the town. Sand-drift on to the promenade and into the adjoining streets is a source of constant expense to the town, as much as £600 a year being spent in removing it.

One fact has been well brought out in the evidence given before the Coast Erosion Commission, and it is well illustrated at this part. No



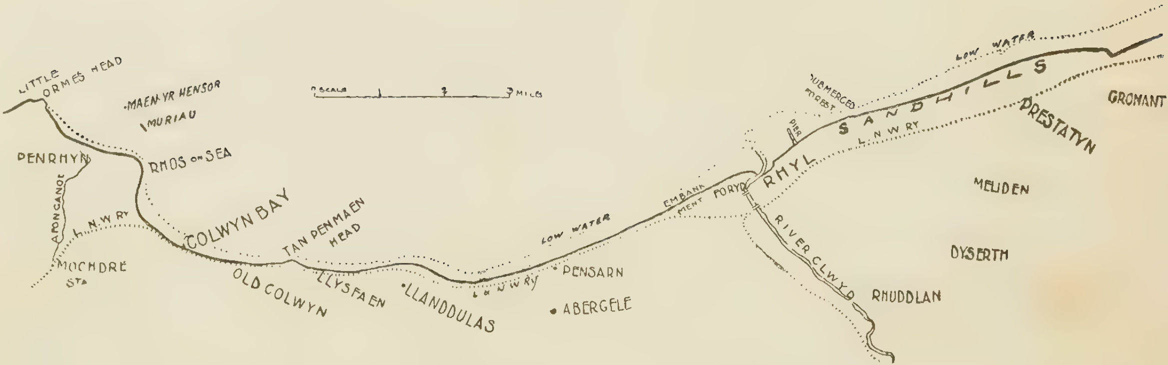
Saxton's Map of Flintshire, 1580.

stretch of coast is ever protected by an embankment or promenade but erosion is increased on the adjoining coasts, especially on the leeward side, as regards the prevailing winds and currents. The material which would have been eroded but for such protection would have been drifted along the coast to form a protecting apron of more or less efficiency. This is one explanation of the rapidity with which the sandhills at the east end of Rhyl are being worn away.

As there is unquestionably a slow subsidence of the whole coast still in progress, it must not be inferred that sea-wear is solely accountable for the sea's advance.

The carting away for many years, dating from about 1892, of shingle from opposite the River Clwyd, at the west end of the town, to the extent of two millions of tons, to provide material for the making of the Liverpool docks, has also tended to reduce the protection which this shingle would have afforded had it been allowed to drift to the east end of the town. The Rhyl Urban District Council, after repeated protests to the Board of Trade, caused this to be stopped in 1906.

A curious change in the bed of the River Clwyd, at its entrance into the sea, took place in 1905, owing to the river mouth becoming dammed by an old war-vessel becoming stranded across it. Previous to this date the river had turned westward. It now turns due east before joining the sea. This is a resumption of its course prior to



River Dee to Colwyn Bay.—Present Day.

about 1860, when it flowed parallel with the promenade.

The Vale of Clwyd was in pre-glacial days an arm of the sea, lined by cliffs (described by Mr. J. Lomas, F.G.S., in Brit. Ass. Report, 1896), the floor of which subsequently became covered with glacial drift.

The submarine forest of Liverpool Bay comes into view again at the east end of Rhyl. In October, 1907, the writer counted over 40 tree stumps within a short distance of low-water mark. A peaty clay surrounds the tree stumps, but this has for the most part been washed away and replaced by drifted sand. Shingle and deep peat-beds underlie the sand both in front and at the rear of Rhyl.

. . . .

CHAPTER XIX.

THE ABERGELE AND COLWYN COAST.

We come now to a section of the coast of special interest, as it concerns a vanished extensive and important tract of land, the loss of which has been in the main due to causes different from mere sea erosion, as in the case of most of the sections dealt with in previous chapters.

The lost land of Morfa Rhianedd, or Dôl Rhianedd, there is good reason for believing, extended from some point on the Flintshire coast, probably in the neighbourhood of Prestatyn, and that it extended from two to three miles north of the present coast-line and of the Great Orme's Head, connecting with Anglesey some miles north of Puffin Island.

Puffin Island, or Priestholme, by which name it was formerly known, is still considered as a part of the County of Flintshire, and the evidence is sufficiently abundant in support of the tradition that the subsidence of this coast which had probably been proceeding for an unknown period, was emphasised by a sudden fall of several feet in the early part of the sixth century. This would cause a great inrush of the sea permanently overwhelming the low-lying and fertile tract of land which lay between the present coastal range of hills and the old high-water mark. This inundation is best authenticated in connection with the Menai Straits end of the coast strip concerned. Further particulars are reserved for a separate chapter dealing with this, the most notable event in the past history of this coast.

In the north wall of Abergele Churchyard may still be seen a stone with the following inscription:—"Here lies, in the graveyard of St. Michael, a man who had his home three miles to the north." The spot must have been fully two miles out to sea from the present low-water mark.

The exact site where Richard II. met, and was captured by, Henry Bolingbroke, has been the subject of much disputation. The point has been settled in a way which proves that where the main road between Abergele and Colwyn now climbs the headland of Penmaen Head, east of Old Colwyn, it followed in 1399 the coast level at the foot of this headland. A French nobleman, in a description of the event, in a manuscript now in the British Museum, wrote: "We could not get away on one side owing to the sea, or on the other owing to the rock."

There is ground for the belief that this was the same road which would appear to have run along the lost low land. Foryd, near Rhyl, Mr. E. W. Cox, in a paper read before the Lancashire and Cheshire Historic Society (1894 volume), states was the ford by which this road crossed the Clwyd. West of Penmaen Head its course cannot be traced, "till we find an ancient trackway crossing by Penrhynside, in rear of Little Orme's Head, where it appears to have trended with a branch towards the south-west, to meet the causeway projecting from Puffin Island."

On the Denbighshire side of the Clwyd river the expenditure of the L. & N.-W. Railway Company has been on a lavish scale in order to secure the line from damage by the sea's inroads. In the last 15 years nearly half-a-million pounds has been expended in protective works, chiefly on a strong sea-wall with groynes, east of Abergele.

An old embankment, originally made by the Rhuddlan Marsh Embankment Trust, had completely disappeared through sea-wear some years ago. Between 1872 and 1899 66 yards of land between the railway and the sea had disappeared at a point opposite Ty Gwyn.

From near Foryd Station successive embankments have been washed away, and every high tide, aided by a N.W. wind, floods the land for some distance inland. For some days in 1906 the high road from Abergele to Rhyl was under water, and many houses were invaded by the sea.

East of Abergele the whole of the formerly protective shingle has gone, and it seems destined to disappear as far as the Clwyd.

East of Penmaen Head, where there is a high cliff of boulder clay, the wear has amounted to 20 feet in 15 years. The worn-away part drifts on to the Abergele coast, where it forms a protecting shingle.

Penmaen Head, like the Great and Little Orme's Heads, is composed of carboniferous or mountain limestone, a much more durable material. But the dip of the rock strata is quite the reverse in the Great Orme to that which it takes in Penmaen Head. These headlands have resulted mainly from the scooping out of the softer boulder clay deposits which once filled the Rhos and Abergonal valleys and the parts adjoining the present headlands.

At Colwyn, prior to the making of the Promenade, erosion had been proceeding steadily. Large tracts of the beach have been lowered as much as six feet in the six years ending 1907. (See Coast Erosion Report.) Protecting groynes were fixed in 1906, the effect of which has been to accumulate shingle, which threatens to cover the sea-edge of the promenade west of the pier. Cultivated land has also disappeared in the sea at other points. An old man at Groes told the writer (1908) that he could remember a hedge standing decidedly below the present high-water mark between the pier and Old Colwyn.

Some twenty years ago a huge monolith called Maen-yr-Hensor stood out at sea fully half-a-mile below low-water mark, opposite Llandrillo Church. Maen Rhys, by which name this stone was also known, was the name of a chief shepherd of the district, who lived in the 12th century, and who is said to have blown his horn from this stone. In 1893 this stone stood in nine feet of water, two feet above low water. Its size at the top was 36 inches by 3 inches.

The ancient lost land north of Colwyn was protected by Muriau or walls, signs of the remains of which may still be seen on a very low ebb of the tide in the shape of a long line of surf as the waves break upon them. The walls are said to run out about a mile from the shore for about four miles in a west-to-east direction. They are best seen opposite the Mochdre Valley. Tradition asserts that there were 30 gates in the dyke between Gogarth and the Point of Air.

The evidence is abundant and conclusive that the course taken by the Conway river, prior to the submergence of Morfa Rhiannedd, in the 6th century, was not as now, west of the Great Orme, but through the valley of Abergonal, along which the L. & N.-W. main line now passes, and seawards between the Little Orme's Head and Bryn Euryn, the hill above Rhos. The ancient course is easily traceable. The dry ditch which marks it in places continues to be the boundary of Denbighshire and Carnarvonshire. The name "Mochdre" is derived from "Moch-trai," meaning "quick tide"; and the names of farms in the neighbourhood form good evidence as to a river having once coursed through this valley. Mochdre Station stands to-day right in the old Conway bed.

Dinerth (a fort) was the ancient name of the Colwyn district. Tradition assigns as the site of a place of that name a knoll a mile inland, between Rhos and Conway, where vessels came up the old course of the River Conway to discharge cargo. "Old Price," of Pwllycrochan, in one of his books mentions that so late as the beginning of the eighteenth century vessels unloaded coal close by Dinerth farm-house.

The choked river, below Llangystenyn Church, is known as the Afon Ganol, or "middle river," the name probably referring to an ancient division of landed property.

Again at Rhos we come across the remains of a submerged forest, tree stumps being still visible at extreme low water. Pennant, in his "Tours in Wales" records seeing a large number of them at this point. The remains are now very limited in extent. Two beds, the upper and lower, could formerly be seen. The lower Rhos forest during a period of depression became overflown by the Conway river, which covered it with silt and mud. After a subsequent period of elevation another forest sprang up, the remains of which are above referred to. After another period of depression the Conway river again destroyed its vegetable life prior to taking a fresh course to the sea when the great inundation of the sixth century is believed to have forced an entrance to the sea. The date when this change took place is necessarily conjectural, and it is not unlikely that for a time the river followed both exits to the sea, the old and the new. It is possible that the great submergence of Morfa Rhiannedd itself, presumably in the sixth century, brought about the change in the river's course to the sea as we have it to-day.

The Rev. Meredith Hughes, whose thorough knowledge of this coast has been readily placed at the writer's full disposal, can remember tree trunks being also well seen almost opposite the railway station at Old Colwyn.

CHAPTER XX.

THE GREAT INUNDATION AND A PALACE UNDER THE SEA.

A departure is here made from the consecutive sectional treatment of the Welsh coast in order that the changes about the headland of the Great Orme may be the better understood, when we come to deal with them in the next chapter.

Many instances of coastal subsidences are, of course, on record as having occurred for the most part within the earthquake zones of the earth's surface, and usually in connection with earthquake shocks. Perhaps the most notable example was the sinking of the sea-bottom of the Gulf of Corinth in the year 375 B.C., when the entire Grecian city of Helike, the most important in Achaia, was completely engulfed. The earth sank at least 100 feet.

The great inundation referred to in the last chapter, of the low-lying land which formerly stretched along the coast from Flintshire to Anglesey, probably from two to four miles north of the present coast, and which converted a fertile valley or plain into the present Menai Straits, is first mentioned in a poem by the British bard Taliesin (A.D. 520-570). He refers to the event as occurring during the lifetime of his own contemporaries. Its probable date was about the year 520 A.D. It is next mentioned in the Welsh "Gorhoffet," 1115-1190, and in the "Welsh Triads," a collection published by T. Jones in 1801. It is also mentioned by other Welsh historians. Traditions about the event have persisted not only on this coast, but in other parts of North Wales. "Long before visitors came to Llandudno," Mr. Elias Owen says, "this tradition was quite confidently told."

That part of the submerged land now covered by the waters of the Menai Straits, then known as the Cantref Gwaelod, is described as having been a "most delicate vale, abounding in fruitfulness and excelling all other vales in fertility and plentifulness."

We owe it mainly to the thoughtfulness of a Welsh clergyman, whose name is not now ascertainable, that the principal details of the floating tradition were gathered together—when, we can only surmise—and cast into a document which was retained in his family during some generations as of value. One of his descendants, an old lady, decided to give it publicity, and sent it to a magazine, wherein it first saw the light about the year 1830 (?1850).* The following, with explanatory interpolations in brackets, are extracts from this account:—

THE LEGEND.

"There is a very ancient legend or historical tradition of the inundation of the land of Helig ab Glanawg, or Morfa Rhianedd, between the Great Orme's Head and Priestholme, still extant, preserved also in ancient manuscript. (Here follows the ancestry of Helig, who appears to have been a grandson of Caradoc the Valiant, King of North Wales.) This Helig was lord of Abergele, Rhos, Arllechwedd, Lleyn, Cantref Gwaelod; and he was also Earl of Hereford. In his time happened the great inundation which surrounded Morfa Rhianedd, the most delicate, fruitful, and pleasant vale lying from Bangor to Gogarth (Great Orme's Head), and so to Tyganwy (Deganwy) in length, and in breadth from Dwygyfylchi (near Penmaenmawr) to the point of Flintshire which came up from Rhuddlan (in the Clwyd Valley) to Priestholme (Puffin Island); and in the upper end whereof did extend in breadth from Aber and Llanfair (fechan) to the river Ell, which did divide Caernarvon from Mon (Anglesey) and did likewise divide Mon from Flintshire, running between Priestholme and Penmon (Point of Anglesey) and so discharging itself into the sea a great way beyond Priestholme, and did surround many other rich and fruitful bottoms and vales within the counties of Carnarvon, Flint, Anglesey, and Merioneth, most of them being the land of Helig ab Glanawg, whose chiefest palace stood in this vale, much about the middle way from Penmaenmawr and Gogarth (on the Great Orme), the ruins whereof are now to be seen upon a ground ebb some two miles within the sea directly against Trwyn-yr-Wylfa, or Point of Wailing, which is a hill lying in the midst of the parish of Dwygyfylchi, unto which hill Helig ab Glanawg and his people did run up to save themselves, being endangered with the sudden breaking in of the sea, and there saved their lives, and being come up to the point of that hill and looking back, beholding that dreadful and ruthful spectacle instead of their incomparable vale excelling all other vales in fertility and pleasantness, Helig and all his people wringing their hands together, bewailing their misfortune, the point of which is called to this day Trwyn-yr-Wylfa, the Point of the Dolefull Hill. Helig had another manor house at Pullheli, the ruins whereof are to be seen on the right hand as you go out of the town towards Aberech; this Town was called Pullhelig, and of late Pullheli. He lived for the most part at either of these houses."

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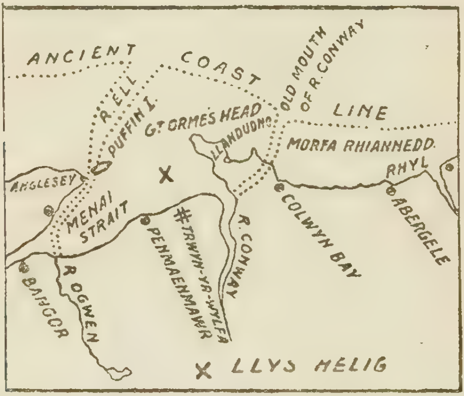
* It is probable that the original source is the manuscript of Charles I time entitled "An Ancient Survey of Pen Maen Mawr," by Sir John Gwynn of Gwedyr, in which substantially the same account appears. This MS was printed (30 copies only) in 1859, edited by J. O. Halliwell, Esq., F.R.S., and re-printed in 1906 by Mr. W. Bezant Lowe, F.G.S.

The original source of the following extract from Hicklin's "Handbook to Llandudno" (1858) has not been traced:—"The tragical occurrence was prophesied, it is said, for generations; and a threat had gone forth, that vengeance should overtake the family of Helig ab Glanawg for the crimes of his ancestors. Night after night, on the wild rocks and shores, amidst the hills and in the valleys, was heard the fearful cry of 'Dial a ddaw! dial a ddaw!' but the wailer was invisible to all. At length it came, and suddenly, as mighty calamities, even though dreaded, generally do;—there was a great feast in the house of Helig, and the guests forgot in their jovial carousal, that fate was only pausing to overtake them. They called for more wine, and a servant was despatched into the cellar to procure some, while the old harper sat leaning on his harp, and the tears ran down upon the strings; for his spirit foresaw some coming evil. They reproached him for his silence, and he put forth his hand to awaken the chords, when a cry struck his ear, and the next moment the servant who had gone for wine rushed wildly into the hall, shrieking—'The tide! the tide!' Those two alone had time to quit the house of Helig, and found safety in the mountains; all besides were swallowed—lands, flocks, and villages—by the tempestuous torrent; and the fertile vale of Conway for miles was all one sheet of foaming waters, as it remains to this day."

The sketch-map shows the River Ell mentioned in this account to have been in all probability a continuation of the river which flows down Nantfrancon Pass, and which now enters the straits near Penrhyn Castle. According to the traditional account it formed, as far as Puffin Island, between Anglesea and Carnarvonshire, and for perhaps three or four miles north of that point, the boundary between Anglesea and Flintshire. The geological formation of Puffin Island shows that, although only separated by a small space from Anglesea, it has not in historic times ever been joined thereto. The River Ell found its way north to the sea through this deep and narrow channel. The fact that Puffin Island (Priestholme) is still considered a part of Flintshire tends to confirm the truth of the traditional account.



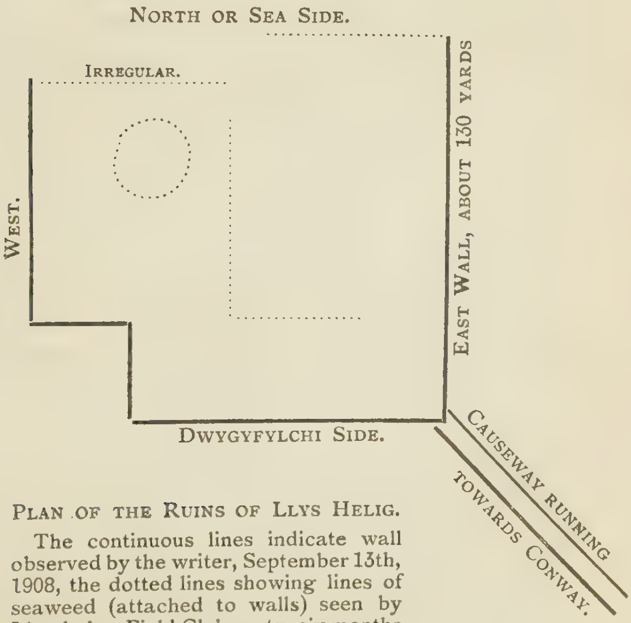
Showing North Wales Coast Line (estimated) in 5th Century, with Position of Llys Helig.

A copy of the foregoing magazine account was lent by the Rev. C. Parry to Mr. Charlton R. Hall, a Liverpool merchant then settled in Llandudno. His curiosity was stimulated to make a search for the ruins of Llys Helig on the mere chance—a somewhat remote one—that any signs of it remained. On August 19th, 1864, there set out in a boat from Llandudno an exploring party, consisting of Mr. C. R. Hall, Rev. R. Parry, Rev. T. R. Fergie, Vicar of Ince; Hugh Roberts (boatman), Edward Roberts, his son, and a boy, John Roberts. A long search revealed nothing until a patch of seaweed was observed. This seaweed they found was attached to straight lines of rocks or stones. No remains appeared above the surface, but the lines bore every appearance of marking the foundations of the walls of the lost palace. Traces of a round tower inside the square were also noticed. The walls stood in a depth of five or six feet of water.

A manuscript copy of an account which Mr. C. R. Hall wrote of this visit came into the possession of the writer by the favour of Mr. F. Holland, of Llandudno, to whom it had been lent by R. S. Simpson, Esq., of Craig-y-don, who wished the clues therein contained to be investigated.

On reading this account, the interest of the writer in any direct proofs of coast subsidence determined him to take advantage of the first abnormally low tide coinciding with favourable weather conditions, in order to make an independent search for the remains of Helig's palace.

Sufficiently high tides could only be expected about the March or September equinoxes, when the weather is liable to be the reverse of calm. Just 44 years after Mr. C. R. Hall's search the conditions proved highly favourable, and in the early dawn of September 13th, 1908, Richard Thomas, a Penmaenmawr boatman, and the writer, after an exhausting haul of a boat from its winter quarters at Penmaenmawr over some hundreds of yards of soft sand, were speeding on their way towards the spot indicated in the tradition. The black seaweed was soon in sight. On reaching it the writer mounted a large stone jutting some two feet above the surface of the sea. The tide, following upon the abnormally high one of 21-ft. 10-in., was now at its lowest. A glance around sufficed to dispel the theory that these were simply glacial deposits like the black rocks on the west shore at Llandudno, as had been suggested by some writers. Perfectly straight lines of stones, clearly visible either just above or beneath the water, were at once noted, and seen from above would have had the appearance of an architect's ground plan drawn in dark brown lines on the blue ground of the sea's surface. The brown colour was due to a plentiful growth of seaweed of a form never before seen by the writer. Its form was that of a sturdy round stalk, as much as a full inch in diameter, tapering perpendicularly into a broad sword-shaped leaf. It was impossible either to break or dislodge it without cutting. A few specimens were brought away. The stones, which jutted out above the water, at a score of places, were all much water-worn, and seemed to form the apex of a base of thrown-down stones. The straight lines on the Bangor and Dwygyfylchi sides of the square did not vary a single foot from a true line, stretching to about 80 and 90 yards respectively, with a truly rectangular recess of about 20 yards depth at the south corner. The wall on the Deganwy side was almost awash with the sea, and was 100 to 130 yards in length. On the open seaside many stones projected above the water, but not in any regular line. This would be the side most likely to be battered down from its facing the open sea. A stone stood prominently up some 70 yards from the eastern corner. We found this the counterpart of another large stone just under the surface, some 7 feet away, as if they had formed the pillars of



Plan of the Ruins of Llys Helig.

The continuous lines indicate wall observed by the writer, September 13th, 1908, the dotted lines showing lines of seaweed (attached to walls) seen by Llandudno Field Club party, six months later (March 23rd, 1909).

a gateway. Connecting these with the eastern corner was a submerged causeway of about the same width, the flat stones being laid upon each other so as to form generally perpendicular sides. This causeway or sarn would doubtless be used before the great inundation as an approach to the palace, when a previous gradual subsidence may have caused access at certain states of the tide to become difficult. Its direction was in a straight line towards Penmaenbach.

Here and there were stones of a peculiar bright pinky granite colour. These have been proved to be marine incrustations around ordinary stones. Generally speaking, the aspect of the walls and of the rounded stones is just such as might be expected after sea-wear had done its natural work during a period covering about fourteen centuries. The spot is about one and a quarter mile below low water opposite Trwyn-yr-Wylfa, the low hill which projects from the base of Moel Llys, midway between Penmaenmawr and Penmaenbach. It lies also on a line running from Beaumaris to Gogarth Abbey, on the Great Orme, from which it will be about three miles distant.

It is not possible for anyone to view these straight-lined remains, with their four rectangular corners, and to retain any doubts as to their being the foundations of some building which must have been in its day of quite imposing proportions. In circumference it will be between 400 and 500 yards. The exact correspondence of the site, "much about the middle way from Penmaenmawr and

Gogarth," with that described in these words in the traditional account leaves no room for doubt that here we have what is left of the princely palace of Helig ap Glanawg, "lord," in the 6th century, of the lost lands of Morfa Rhiannedd and adjacent parts. The value of the discovery to the geologist is that it forms incontrovertible evidence of subsidence at this part to the extent of at least twenty to twenty-five feet. At the time of the visit the walls stood in from three to five feet only of water. Sand has doubtless accumulated so as to conceal the lower parts. The important bearing which this definite proof of a great subsidence has upon the probable origin of the South Lancashire sandhills has been pointed out in the chapter on the Mersey estuary.

An article descriptive of this finding of "a Palace under the Sea," which the writer contributed to the "Manchester Guardian" (Oct. 1st, 1908), elicited some letters in comment, in one of which Mr. W. J. P. Arrowsmith, of Deganwy, made known the fact that he had twice been engaged on the same search: in September, 1906, when he was taken to the wrong place, and in September, 1907, when the conditions were very favourable and he saw sufficient of the ruins to be able to confirm the writer's description of them. In addition, he could trace the foundations of a circular tower inside the square. Others, the writer subsequently learned, had made searches for the ruins.[*]

There are reasons for the belief that a serious subsidence may have taken place also in the fourth century. One reference (quoted by the Rev. Richard Parry) in the Jole MSS. (p. 419) says that "In 331 A.D. sea and land floods occurred coincidently when the territory of Helig, the son of Glanog, of Tyne Helig, was inundated and irrecoverably lost." We have no means of determining whether the date here given is an error or whether this flood was confused by the writer with that which took place in the early part of the sixth century.

But the truth probably lies in the supposition that this coast has been subsiding continually, probably as far back as the age of Palæolithic man. That the downward movement has continued in recent times is proved by an examination of Collins' Hydrographic Survey of 1693. This shows the course taken by two roads marked respectively the "high-water way," which ran close to what is now low water on the Carnarvonshire side, then climbed the point of Penmaenmawr mountain, and left the shore opposite Llanfairfechan, then making a straight line for a ferry opposite to Beaumaris; and the "low-water way," which traversed along a diagonal line from Penmaenbach, which is now between one and two miles below low-water mark, and joining the first route opposite Beaumaris. That a slow subsidence is in progress all along the North Wales coast is confirmed by every official surveyor from whom the writer has obtained an opinion.

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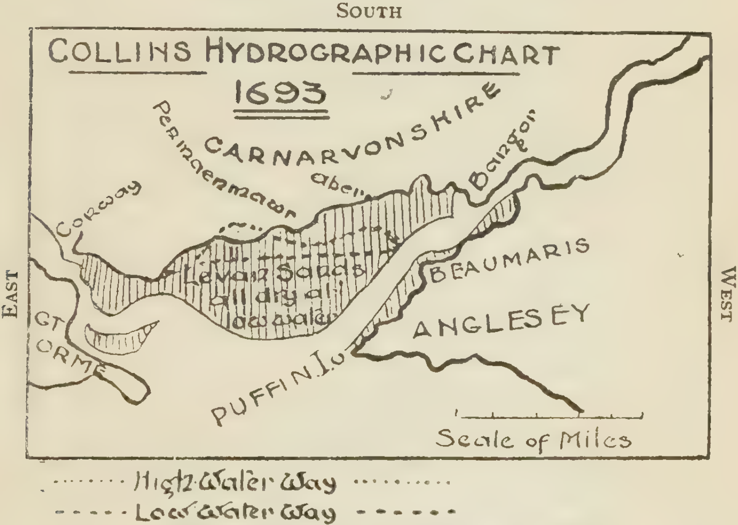
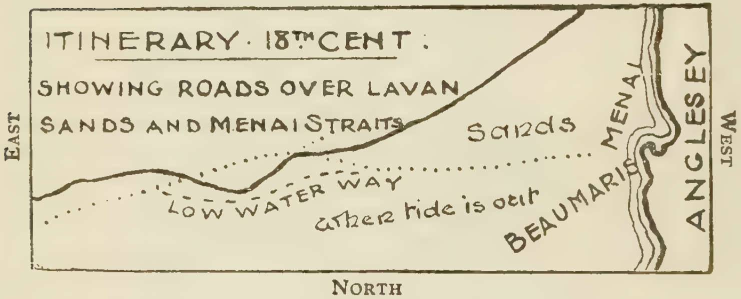
[*] Advantage was taken six months subsequently to the writer's discovery, of the exceptionally low tide of March 23rd, 1909, by some members of the Llandudno Field Club, to examine Llys Helig. The occupants of the two boats were Messrs. L. S. Underwood, Gilder Rowlands, Gresley Jones, Fred Holland, Williams, Brocklehurst, and W. J. P. Arrowsmith. The tide though more favourable nominally (22 feet 2 inches) revealed less of the ruins by about ten inches than on the writer's visit, so that little but seaweed was visible. Nothing was observed further than has been described above, except that the interior was examined and the seaweed lines showed inside walls as denoted by dotted lines on the block-plan. The east wall was measured and found to be 130 yards in length. Mr. W. Bezant Lowe, of Llanfairfechan, who had made several previous searches, was also present on this occasion. Another party, including Messrs. G. A. Humphreys, John Roberts and others, examined at the same time some rocks known by fisherman as Burlingham Rocks, about a mile south-east of Llys Helig and opposite Penmaenbach. A pickaxe revealed undoubted remains of some building or wall; also mortar remains and numbers of flat faced roughly squared stones, leaving no room for doubt about this having been human handiwork. This would almost certainly be a portion of the sarn or causeway which once connected Permaenbach with Puffin Island or Llys Helig.



COLLINS CHART MENAI STRAITS 1693

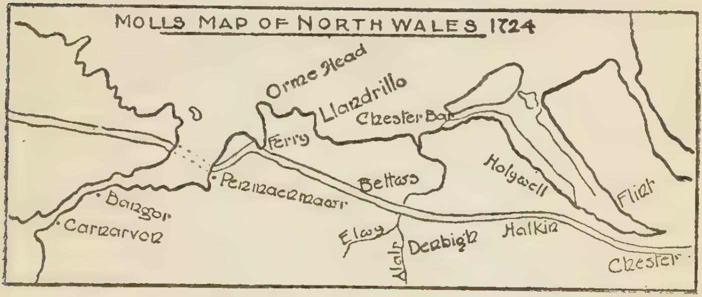
In a paper read before the Historic Society of Lancashire and Cheshire in 1894, Mr. E. W. Cox refers to the number of roads which now terminate on the Carnarvonshire side of the Menai Straits, at Llanllechid, Crymlyn, Aber, Llanfairfechan, and Penmaenmawr. Caerhun was a Roman station, Conovium, on the Conway about four miles above the town of Conway. From it a road was constructed by the Romans over the hills, through the Pass of Bwlch-y-ddaufaen to Aber, and is still easily traceable. This road, which formerly crossed the sands by a causeway opposite Beaumaris, was used until some time in the 18th century, as shown by an Itinerary in possession of the Historic Society, as well as by Collins' Chart, to which reference has been made.



This was no mere track over the sands. Mr. Elias Owen writes: "I well remember 35 years ago (circ. 1859) noticing the ridge or raised roadway then existing, and which there was every reason for believing was a Roman road, raised and paved, going over the sands, and which most likely ended in a ferry opposite Beaumaris."

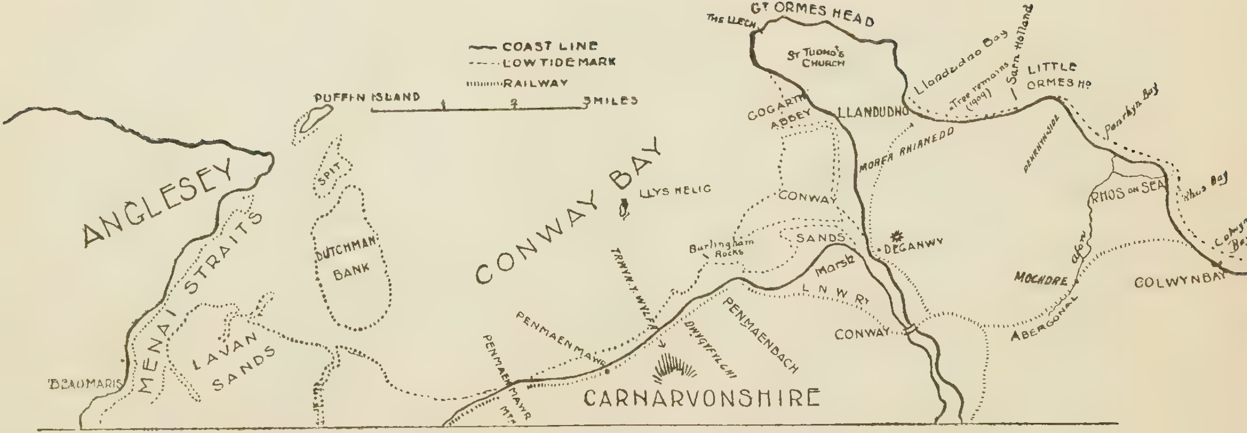
Mr. John Roberts, of Bryn Celyn, Llandudno, states that when a boy, about 1860, he had heard some Great Orme's Head copper miners say that they used to walk from Amlwch, on Anglesey, over the sands from near Beaumaris to Penmaenbach without the use of any boat.

Mr. Cox examined the remains of another causeway or sarn which tradition is strong and general in affirming once connected Puffin Island with Penmaenbach. He described it as "a raised causeway 12 to 15 feet wide, apparently paved with large stones, well fitted together." It would pass close to Llys Helig. It ran out from Anglesey, close to the point nearest to Puffin Island.



Pugh, in his "Tour through North Wales" (1812), says he found the "causeway pointing from Priestholme island to Penmaenmawr easily visible."

Sir John Gwynne's "Ancient Survey of Pen Maen Mawr," previously referred to, throws valuable light upon the origin of this causeway, and also upon the aspect of the coast three



Colwyn Bay to Menai Straits in 1908.

hundred years ago. The following passage (with omissions) is taken from pp. 19-21 of Mr. W. Bezant Lowe's reprint (1906), but with the spelling modernised :—

"Seirial, brother to Helig, was termed the holy priest, and was head of the religious house in Priestholme, in Flintshire, which house was called Priestholme from Seirial. This Seirial had also an hermitage at Penmen Mawr, the place being then an uncouth desert and inaccessible both in regard of the steepness of the rock and of the desertness of the wilderness there, being so thick of wood that a man having once entered thereinto could hardly behold sky or firmament. From Priestholme to Penmen Mawr did Seirial cause a pavement to be made, whereupon he might walk dry from his church at Priestholme to his chapel at Penmen Mawr, the vale being very low ground and wet, which pavement may at this time be discerned when the sea is clear. Since this great inundation, the way and passage being stopped in this strait in regard the sea was come in, this holy man, Seirial, did cause a way to be beaten and cut through the main rock (Penmen Mawr). This way leadeth from Dwygyfylchi to Llanvair Vechan. The way is cut through the side of a rock, still ascending until you come to a crick upon the rock called Clippyn Seirial, and then is cut through the side of a steep, hard rock, neither descending nor ascending until you come to Seirial's Chapel, and all that way is 200 yards above the sea; and from the Chapel still ascending until you come again to the sea shore within the parish of Llanvair (fechan); this way is in breadth two yards, but in some places scarce a yard. And this way is ever since kept by a hermit, who hath nothing for his labour but the charity of well-disposed passengers and a gathering once every year in the parishes adjoining."

The name of "Lavan Sands," the wide stretch exposed at low tide opposite Llanfairfechan, has the same derivation as "Trwyn-yr-Wylfa," the "Point of Wailing or Watching," between Penmaenmawr and Dwygyfylchi, whence the inmates of Llys Helig fled for refuge. "Traeth Wylofan" means the "inlet of lamentation."

The Llys Helig tradition was made in 1872 the subject of a drama by the Rev. John Williams, of Llanllechid. It has been performed in several Welsh towns and villages. The noted antiquarian, the Rev. Griffith Edwards, introduced the event also into his poem of "Cantref Gwaelod." To these should be added a fine poem by Lady Marshall, "Helyg's Warning: A Cymric Legend of the Seventh Century." (J. Masters, London, 1854.)

Helig was the father of many sons. Of these, Celynin, Rhychwyn, and Peris founded and became the patron saints of the churches of Llangelynin (near Conway), Llanrychwyn (near Trefriw), and Llanberis.

CHAPTER XXI.

LLANDUDNO, DEGANWY, AND THE MENAI STRAITS.

The name Morfa Rhiannedd is now restricted to the low-lying neck of land between the Great and Little Orme's Heads. It is all that remains of the lower-lying lands of the coast which formerly stretched from beyond Rhyl to Aber, as described in the last chapter. How far north of the Great Orme the land stretched fifteen hundred years ago we can only surmise, but the traditions of the neighbourhood indicate that within the last three hundred, and perhaps two hundred, years cattle have grazed in fields lying at the foot of the Orme's Head.

Near the eastern edge of the Great Orme's steeply-descending slope stands the ancient Church of St. Tudno.

It is a reasonable supposition that it was originally built here to serve the needs of those who lived on the plain at the foot of the rocks, against which the waves now never cease to beat. There is no reason to believe that any number of people ever lived on the exposed headland itself, and its site is far from the low-lying land now the site of the town of Llandudno.

Close by the old church a road runs to the edge of the cliff and down the steep to the sea. It is known as Hwlfa Ceirw, the roadway of the deer. Buckley says that the tradition is that it was the path used by deer to descend to the meadows at the foot of the cliffs. Nothing but huge boulders now line the sea margin at this point.

The Llech, a gorge beyond the lighthouse, now known as St. Tudno's or the Smugglers' Cave, was formerly accessible to climbers. Near here the tradition is that a palace of Llewellyn stood, and a few remains may still be seen. The remains in the Llech cavern may still be described as they were in an account published about 50 years ago. Their existence here supports the supposition that they were originally built at a distance from the sea. "Large stones are piled carelessly upon each other so as to hide the entrance. The cavern is about 10 feet high, lined with smooth and well-jointed, strong work, with a plain cornice at the height of 7 or 8 feet. The fronts on each side are faced with smooth stone. Close to the entrance is a font. The floor has been flagged."

On the Conway estuary side sea-wear is proceeding rapidly, the cliffs here, mostly of clay, being of a softer character. Especially rapid has been the decay where a few low walls on the edge of the steep now mark the site of Gogarth Abbey, once a palace occupied by the Bishops of Bangor. From here when the Abbey was founded a fine view of the "fruitful and pleasant plain" now covered by the waters of the Menai Straits would be obtained.

Prior to about 1820 the flat part of the peninsula where the town of Llandudno has since arisen was an almost impassable swamp. Blown sand, which is plentifully brought down by the Conway river, has covered the layer of 9 to 12 inches of black peat which underlays the sand, so that it has become suitable for building purposes. In the peat layer stags' horns have in recent years been found. Here and there islands of boulder clay crop out through the peat and sand. The sand-dunes between Llandudno and Deganwy are all of comparatively recent origin. Previous to the great subsidence this sand would be deposited east of the old mouth north of Rhos.

On Llandudno west shore the coast-line has altered little for a considerable period, but the Conway channel is very unstable. For some years it has been advancing, until now (1909) it is only 200 yards from the high-water mark of ordinary tides. In 1887 it was 580 yards from the same mark.

In Llandudno Bay a constant lowering of the surface has been caused by tidal action since about 1892. In 1894 no steps were required to descend by from the Promenade at any part. As a protection from undermining, the authorities have constructed concrete steps, each 6-in. deep, from five to eleven in number; and the hollowing out of the bay still continues as far as Carmen Sylva Road. The loss is greatest opposite Lloyd Street. The beach from opposite Craig-y-don to the Little Orme's Head is, on the other hand, being raised by the drifted sand and shingle from the western half of the bay.

An interesting consequence of this beach-lowering was the discovery, on March 22nd, 1909, by Mr. G. A. Humphreys, accompanied by Mr. John Roberts, of remains of tree trunks in Llandudno Bay, immediately opposite Nevill Crescent Promenade shelter, and only 182 yards distant therefrom. These forest remains were found in an oval-shaped patch of red clay, dotted with loose stones, bare of sand and near low-water mark. The largest trunk was 51 inches in diameter. One straight root extended for 20 feet before dipping into the clay. Some were clearly oak trees. The remains were examined by the writer a month after their discovery. A noteworthy point about this ancient land surface is that it was only three or four feet higher than the land upon which Helig's palace, on the other side of the isthmus, stood.

On the same day Mr. Humphreys visited also the old Causeway jutting into the sea near the Little Orme's Head, and known as "Sarn

Holland." This was clearly visible above the sea 100 yards or so beyond low-water line.

A report on the cause of this loss of beach, drawn up by Mr. E. P. Stephenson, A.M.I.C.E., assigns it to the coinciding of north and north-east winds with tides about 16 feet. Steady east or west winds rather tend to repair the mischief.

The striking promontory of the Great Orme's Head, with its imposing cliffs rising on three sides almost precipitously from the sea, is formed, like the Little Orme's Head and Puffin Island, of carboniferous limestone. The dip of the strata on the Great Orme is directly opposite to that of Penmaen Head, on the east of Old Colwyn, both inclining in the direction of the ancient outlet of the River Conway, near Rhos. The name "Llandudno" was applied, long before the town of that name came into being, to the Great Orme's Head itself, "Llan" meaning literally an enclosure around a church, and "dudno" coming from the name of the reputed founder of the original church, St. Tudno. Pennant, in his "Tours," so applies the word to the headland itself.

Caves are a common feature in carboniferous limestone formations, and we find examples along the North Wales coast at Cefn and Plas Heaton, on the west side of the Vale of Clwyd, where remains of the mammoth, rhinoceros, hippopotamus, &c., have been found. The most interesting example in the neighbourhood of Llandudno is Kendrick's Cave, on the south-eastern side of the Great Orme, almost opposite Mostyn Street. The cave takes its name from a lapidary, Thomas Kendrick, who used it in the early days of Llandudno as a workshop. He was the first to find animal remains amidst the stalactitic accumulations and limestone breccia. In 1879-80 the skeletons of four human beings, all small in stature, were found. Remains of bison, bear, badgers, and other animals have also been found. Professor Boyd Dawkins has expressed the opinion that the human remains are those of the Neolithic age, and that the cave was used as a sepulchral vault by a family of small Iberic dwellers in the neighbourhood. We obtain some idea as to the age when these people lived when we realise that it must have been prior to the Metallic age, which dates back to at least 2000 years B.C. These particulars are gleaned from an excellent account of the cave written by Mr. G. A. Humphreys, F.R.I.B.A., of Llandudno, and are reproduced here by his kind permission.

The late Mr. E. W. Cox, in the paper to which reference has previously been made, makes out a strong case for the theory that the sites of the various forts along this coast were built, both by the native Britons and the Romans, primarily to defend the main road, which traversed the submerged lowland of Morfa Rhiannedd from Foryd, near Abergele, to beyond the south-western end of Menai Straits. Every fort defended a vale or plain.

The Great Orme's Head had its camp on the south-eastern edge, on a site long since worn away by the sea. Roman coins and tile fragments have been found near by. On the Conway side of Llandudno Marsh the Roman fort of Castell Tremlydd and the British city of Deganwy, with its stronghold, once stood. The road would pass Llys Helig, and thence along the Strait to the Roman station of Segontium, near Carnarvon, and thence to another Roman station, Dinas Dinlle, about ten miles south-west of Carnarvon, and over what is now sea to the now submerged Roman fortress of Caer Arianrhod, remains of which are still plainly visible about two miles south of Dinas Dinlle.

The sarn, or causeway, which formerly connected Penmaenbach with the west end of Puffin Island was doubtless used as an approach to the great British camp of Bwrd Arthur, near the east end of Anglesey, a few miles from Puffin Island. To this stronghold it is on record that an army, under Brocmail, retreated in 606 or 613 A.D.

Another British camp, near the summit of Penmaenmawr mountain, must have been of impregnable strength.

The glories of Deganwy belong to a distant past. Before the Roman occupation it was a town of the Ordovices, weapons belonging to that age having been found here. Tacitus refers to it as Cangorum Civitas. It was the residence of the Kings of North Wales for centuries down to A.D. 810, when it was destroyed by lightning, and the town of Aberconwy was built out of its ruins. The castle was totally dismantled in 1260 by the last prince, Llewelyn ap Gryffydd. Its walls crossed the space between the two hills above the present village and mounted their sides. On the summit of one of the hills the foundations of a round tower only now remain. Near the ford of the Conway river opposite was the meeting-ground, century after century, between the English and resisting Welsh, and some of the bloodiest battles in Welsh history were fought here.

Reference was made in the last chapter to the proofs of continued subsidence in the Menai Straits basin. Sea erosion continues to aid in the general widening of the Straits. Especially marked has been this sea-wear on the coast opposite Dwygyfylchi, where a few years ago a stormy sea made a gap in the railway embankment, into which a goods train was precipitated. Both here and at Penmaenmawr the L. & N.-W. Railway Company has spent large sums in building barrier walls against the continued encroachments of the sea. Some of the material thus removed tends, by drifting to adjacent points on the Llanfairfechan coast, to protect the beaches there, and since 1904 accretion has consequently set in at points formerly subject to erosion.

About 1905 the old embankment opposite Bryn-y-newadd, at Llanfairfechan, was washed away, and was replaced by a concrete wall. Groynes have also been put down towards Aber. The

Dutchman Bank, between Llanfairfechan and Puffin Island is constantly shifting in position.

Penmaenmawr mountain largely consists of enstatite-diorite, one of the oldest and hardest of metamorphic rocks. Hence its withstanding of the erosive influences of time, and the quarries which provide the granite cube pavements of so many English towns and cities.

In prehistoric times, when Kendrick's Cave was used as a cemetery by the Iberic people of that age, a forest connected Anglesey with the mainland. The remains of this forest could formerly be seen in Beaumaris Bay, as also on the north-west of the Anglesey coast. Sir John Gwynne's Ancient Survey (temp. Charles I.) says: "In this great waste (the Lavan Sands) upon a low ground ebb are to be seen the roots of great oak and ash. I speak as an eye-witness; so that it should seem that this vale before the inundation was a woodland country."

CHAPTER XXII.

LOST MERIONETHSHIRE AND CAER ARIANRHOD.

Cardigan Bay is beyond the limits of the coast with which it was proposed to deal in these chapters, but the remains of walls still to be found there far from low-water mark have a distinct interest for the student of the changes on the coast further north. The substance of the tradition about these walls is as follows :—

"At the ebb of the tide part of a long stone wall which runs out into the sea from Mochras, a point of land a few miles south of Harlech, may be seen. It is called Sarn Badrig, or St. Patrick's Causeway, an astonishing work, being throughout 24 feet thick. It runs out to sea in a serpentine manner about 22 miles from the coast of Merionethshire, about half-way between Harlech and Barmouth. The principal city in the locality is supposed to have been Caer Wyddno, or

Gwyddno's City. This Gwyddno was the last of its princes, and flourished from about the year A.D. 460 to 520. At the end of Sarn Badrig are 16 large stones, one of which is four yards in diameter. Sarn-y-Bwlch runs from a point north-west of Harlech, and is supposed to meet at the end of this. It appears at low water near the mouth of the Dysynni. The space between these once formed a habitable hundred of Merionethshire, called Cantre 'r Gwaelod, and these walls were built to keep out the sea. The catastrophe of its being deluged is recorded in ancient verse, preserved in very old MS. called 'The Black Book of Caermarthen.' The inundation is said to have happened about the year 500 A.D."

The date given by Meyrick is 520 A.D., whilst other authorities, as Carlisle, estimate it as towards the close of the 6th century. Tradition states that 1000 persons and 16 fortified towns perished. The stones of the wall known as Sarn Gynfelin, which were formerly visible above high water, are now two feet below it.

Another convincing piece of evidence that there has been an extensive subsidence on the Carnarvonshire coast is the fact that remains of a fortified Roman station, Caer Arianrhod, are still to be found nearly a mile below low-water mark off the west coast, about 10 miles south of Carnarvon and three miles west of the village of Clynnog. At low tide a semi-circle of large stones, perhaps 250 yards in extent, may be well seen. One stone was seen by the writer above the water at a distance of over two miles. From this town a road, now under the sea, led direct to the important Roman station of Segontium, now the site of Carnarvon. The writer was informed by a native fisherman that the site of Caer Arianrhod was still a vast rubbish heap of old buildings, crockery, and other remains, which he had often seen through the water. The site is uncovered during exceptionally low tides.

Though not often marked in modern maps, it appears on a map of Speed's of about 1610 date. The spot has a place in more than one Welsh tradition, and is mentioned in two of the mediæval stories in the collection bearing the name of "Mabinogion" (1200-1250), an English translation of which has been made by Lady Guest.

Professor Rhys states, in his "Celtic Folklore" (Vol. I., p. 209), that "The idea in the neighbourhood is that the place was inundated on account of the wickedness of its inhabitants. So it would appear that Gwennan, Elan, and Maelan, Arianrhod's sisters, were the just ones, allowed to escape. Arianrhod was probably drowned as the principal sinner in possession" at the time of the overwhelming of the town. It is highly probable that the same subsidence which caused the loss of so much land in Cardigan Bay, Beaumaris Bay, and the north coast of Wales, also caused the destruction of Caer Arianrhod, Lyonesse, off Cornwall, and the changed courses of the Mersey and Conway rivers. The date 520 A.D.

would accord with all the known facts and surviving traditions, and be applicable to all.

Mr. Bezant Lowe's new work (1909) should be consulted by all desiring more detailed information upon the archæological and geological features of interest on and near the Carnarvonshire and Denbighshire coasts.

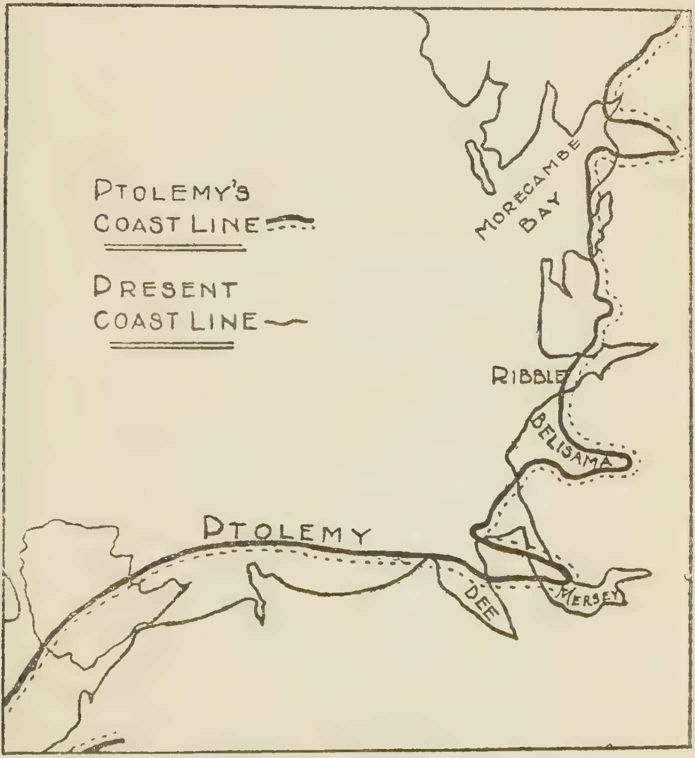
CHAPTER XXIII.

Ptolemy's "Belisama," and Summary.

Ptolemy was a Roman geographer, who lived in the second century A.D. No originals of his maps of Britain remain to us—"the copies we have are largely taken from inferior texts handled carelessly or ignorantly." This is the judgment of Mr. T. G. Rylands, who has made an exhaustive study of the various copies extant. Controversy has for long ranged around the question as to what estuary, that of the Ribble or the Mersey, the estuary marked "Belisama" on his maps represents. That marked Seteia Portus is undoubtedly the Dee, but where the maps of to-day show the Mersey and Ribble estuaries, Ptolemy shows only one, and this opens out to the sea about midway between the two—that is, about Formby Point. Those who have taken part in the controversy are fairly evenly divided in opinion as to whether the omitted estuary is that of the Mersey or the Ribble.

For the first time the identification of the Belisama is here approached along a fresh line of enquiry—that of the origin of the Lancashire sandhills.

A consideration of the evidence set forth in the Mersey chapter of this book will incline most unbiased inquirers to the belief that there was, in the second century, no separate Mersey estuary



Earliest Map Extant, by Ptolemy.—2nd Century.

at all. In assigning date-limits as to when the fresh-water lake of the upper part of the Mersey estuary effected a junction with the sea, through land-subsidence and sea-wear on the coast, nothing more definite than a time between 1000 and 1700 years has been ventured upon. If Ptolemy, who was careful within the limits of his knowledge, and who used lines of latitude and longitude, can be trusted so far north—for the further north the more unreliable his maps become—there was no Mersey estuary in existence at all in his day.

The probabilities point to there having been in Ptolemy's day a considerable extension south of the north bank of the Ribble, and to its main channel then entering the sea south of its present course, thus approximating to the position of the "Belisama est." in the most authentic copies of Ptolemy. That of 1482 date is believed to be the most reliable copy.

In the accompanying reproduction of a copy of Ptolemy employed by Mr. T. G. Rylands to support his contention that the "Belisama" is the Mersey, it will be noticed that the sweep of Ptolemy's North Wales coast covers almost precisely the lost traditional land of Morfa Rhiannedd. His map of Britain similarly shows the lost land of Lyonesse, off the Cornish coast. It has been the rule for most writers to assume that he was ignorant of the existence of the island of Anglesey, hence his omission of any indication of the Menai Straits. All the probabilities now seem to point to Ptolemy having been more accurate than those who have laboured to explain his supposed errors.

In the itinerary written by Antoninus during the Roman occupation, of all the rivers from the Conway to the Ribble, there is no mention of any such river as the Mersey.

The argument in favour of the Ribble receives material support from the fact that the river was well known to the Romans, if only from the fact that their most important station in Lancashire, Ribchester, eight miles above Preston, stood upon this river, all their roads in Lancashire radiating from it. It was the Rugby junction of the Roman occupation. It is hardly conceivable that Ptolemy could have been ignorant of a river with so important a town upon it, apart from the presumptive fact that another Roman station stood near the Naze on the north bank of the estuary itself. The only Roman station on or near the Mersey was near Warrington, and this was of comparative unimportance. No mention of Liverpool or any other port on the Mersey is mentioned anywhere until nearly 1000 years after Ptolemy's time.

It is worth noting also that our present ten-fathom coast-line roughly coincides with Ptolemy's coast-line.

Some writers have assigned "Setant Port," or "Haven of the Setantii"—a people who doubtless lived on this coast prior to the coming of the Romans—to the River Wyre, either north

—where the sea now rolls—or south-east of the Fleetwood of to-day. Professor Rhys is in agreement with the Rev. W. T. Bulpit in favouring the north bank of the Ribble as the probable site. Writing of Segontion, he says: "Segeia was most likely not so much the name of the Ribble as of the divinity of the river"; and "The name Belisama occurs in inscriptions found in Gaul as that of a goddess equated with the Minerva of Italy." The word would appear to be connected with "Beltaine" and "Samhaen," the names of the two chief festivals of the Celtic Britain, the first falling on May 1st, the beginning of summer, and the second on October 31st, Hallowe'en, the end of summer. Beltaine fires were lit on all the high hills. Bel, Baal, or Balder was the sun-god. Mr. Bulpit has traced evidences of his having been worshipped in Meols, now Churchtown, Southport, in pre-Christian times. The name "Ribble," it has been suggested, comes from Rhe-bel, "rhe" meaning "swift" when joined to words signifying water. Thornber, in his "History of Blackpool," writes: "I can point out many a cairn of fire-broken stones where the rites of Bel have been performed on the borders of the Ribble, age after age." He also refers to "Sama's Festival" in the same connection.

Samlesbury is the name of a village and hall on the Ribble, five miles above Preston. Its history has been traced to pre-Christian days, when tradition says that it was the site of an important temple. It is worthy of note that the "British

Gazetteer" contains no other name beginning with "Sam." The oldest spelling is "Samelsbyrie." In Speed's map of 1610 (see Chap. XI.) it appears as "Samsbury." A connection with "Sama" and Belisama would appear to be at least probable.

Summarising these considerations, it would appear that if the Mersey was a tributary of the Dee in the second century, Ptolemy's supposed error in marking two estuaries where we have now three is at once explained as being no error at all.

We may now summarise the conclusions arrived at in the foregoing chapters as follows:—

That the main source of the Lancashire sandhills is the millstone grit formations of the Pennine range of hills and its outliers.

That the Mersey and its tributaries bring down by far the largest proportion of eroded sandhill material.

That the Mersey within historical times entered the sea as a tributary of the Dee; hence the accumulation of the Flintshire and West Cheshire sandhill ranges.

That since the Mersey found a new outlet by the existing estuary, these ranges have been almost eroded away, and the Hoyle and Constable banks have been worn away to one-half their previous extent.

That the Mersey's changed course led to the piling up of the Bootle-to-Southport sandhill range.

That the Ribble formerly entered the sea by a channel south of that of to-day, and that the sand brought down was at this early period mainly blown on to the shore between Argarmeols and North Meols, these hills becoming subsequently obliterated, either by the sea's advance or by Mersey-borne sand.

That the sandhills on the north shore of the Ribble estuary have been mainly formed since the Ribble channel moved north and assumed an east-west direction, instead of a north-east to south-west direction.

That low water at Blackpool will continue to recede through the continued drifting north of sand brought down by the Rivers Ribble and Mersey, necessitating pier lengthening from time to time.

That St. Annes-on-the-Sea will have to face a regular and serious expenditure in dredging if its access to the sea at all states of the tide is to be regained and retained.

That the Southport Bog-hole channel is destined to fill up, the Horse-bank outside it and the foreshore inside it to become steadily higher, and eventually available for building purposes.

That the Mersey basin, and probably the whole of the North Wales coast is undergoing steady but very slow subsidence.

That half the town of Rhyl is threatened by sea-wear at its eastern end, with a serious and permanent inundation.

That if subsidence continues the east and west shores at Llandudno will at some period (not imminent) eventually meet, and the town in its lower-lying parts become uninhabitable.

That the errors assumed by almost all writers to have been made by Ptolemy in omitting from his second-century maps an estuary, either the Ribble or the Mersey, and also the Menai Straits, were not errors at all.

Considerations of common justice and of public expediency alike point to the desirability of an alteration in the land laws which would secure to the State, the county, or the local authority the ownership of all accreted land. This would give such authority an incentive to increase such accretion where possible and desirable, and, from the revenue arising therefrom, a national fund could be accumulated out of which compensation could be paid to land-owners on the east and south coasts and elsewhere, whose land is being eroded away. Half of Southport and Birkdale is built upon land which has been a gift of Nature within the last 300 years to the adjoining land-owners. Serious as is the loss from erosion, the Coast Erosion Inquiry has elicited the fact that there is an even larger gain to the country as a whole by accretion.

It would also be an obvious and decided public advantage if bench-marks were fixed at intervals along the entire coast, either by the Imperial or by local authorities, for the purpose of the exact periodical ascertainment of such changes of level as are taking place.

Appended, in conclusion, is a summary of the dates, actual or approximate, of the great coastal inundations to most of which reference has been made in the foregoing chapters :—

A.D. 331 (?).—Menai Straits.

About 520.—Menai Straits and Denbighshire Coast.

About 500-520.—Cantre 'r Gwaelod, a wide stretch on the Merionethshire coast, overwhelmed.

About 520.—Caer Arianrhod, south of Carnarvon, overwhelmed.

563.—Camden records: "There occurred in Cheshire an inundation of the sea by which 5000 persons and an innumerable quantity of cattle perished."

A.D. 200 to 1000 (possibly about 520).—Mersey makes new channel to the sea. (No record of this. Evidence inferential only.)

1279, Feb. 3rd.—Cheshire inundated by the sea. Stanlawe Abbey, near Ince, on the Upper Mersey, flooded, and Chester Bridge carried away. (See Annales Cestriensis, Chronicle of St. Werburg.)

1311 to 1324.—Ancient Aynesdale and Argarmeols permanently overwhelmed."

1395 to 1410.—Mostyn to Prestatyn, flooded by sea.

1400-1500.—Kilgrimol (St. Annes) coast inundated, two to three miles.

1553-4.—Singleton Thorpe (Rossall), Hert, and Fordebottle, near Barrow, overwhelmed.

1700 to 1800.—Old Formby overwhelmed with sand.

1720.—Six thousand six hundred acres overflowed on Lancashire coast; damage at Alt Grange, North Meols, and on Fylde coast.

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